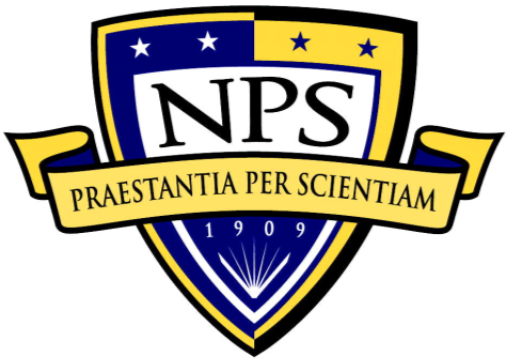
2015-12

# Improving access to military aircraft during civilian wildfires

Dubay, Steve E.

Monterey, California: Naval Postgraduate School




# NAVAL POSTGRADUATE SCHOOL

**MONTEREY, CALIFORNIA**

# THESIS

**IMPROVING ACCESS TO MILITARY AIRCRAFT DURING CIVILIAN WILDFIRES**

by

Steven E. Dubay

December 2015

| | |
|---|---|
| Thesis Advisor: | Carolyn Halladay |
| Second Reader: | Giannina Rikoski |

THIS PAGE INTENTIONALLY LEFT BLANK

| REPORT DOCUMENTATION PAGE | | | *Form Approved OMB No. 0704–0188* |
|---|---|---|---|
| Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503. | | | |
| **1. AGENCY USE ONLY** ***(Leave blank)*** | **2. REPORT DATE** December 2015 | **3. REPORT TYPE AND DATES COVERED** Master's thesis | |
| **4. TITLE AND SUBTITLE** IMPROVING ACCESS TO MILITARY AIRCRAFT DURING CIVILIAN WILDFIRES | | | **5. FUNDING NUMBERS** |
| **6. AUTHOR(S)** Steve E. Dubay | | | |
| **7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)** Naval Postgraduate School Monterey, CA 93943-5000 | | | **8. PERFORMING ORGANIZATION REPORT NUMBER** |
| **9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)** N/A | | | **10. SPONSORING / MONITORING AGENCY REPORT NUMBER** |
| **11. SUPPLEMENTARY NOTES** The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number ____N/A____. | | | |
| **12a. DISTRIBUTION / AVAILABILITY STATEMENT** Approved for public release; distribution is unlimited | | | **12b. DISTRIBUTION CODE** |

**13. ABSTRACT (maximum 200 words)**

Wildfires are a growing problem in the United States, and military aircraft are increasingly mobilized in support of civilian wildfire suppression efforts. The photogenic qualities of aircraft distributing a trail of red "slurry" over a wildfire increase the public's expectation of fire suppression from the air. The problem is that Department of Defense (DOD) aircraft are not dispatched to civilian wildfires in a timely manner, resulting in lives lost, property destroyed, and critical infrastructure damaged. The research question considered by this thesis is, "What improvements can be implemented to existing local, state, and federal protocols to provide a more timely response to civilian wildfires by DOD aircraft?" The current system is complicated and confusing, involving federal laws, such as the Economy and Stafford acts; DOD doctrine and instruction, such as Defense Support to (of) Civil Authorities and Immediate Response Authority; and civilian agencies, such as the National Interagency Fire Center with its *Military Use Handbook* in the existing process to dispatch military aircraft to civilian wildfires. The results of the study recommend that (1) DOD aircraft be more closely coordinated with civilian aircraft via the IRA for responding to civilian wildfires, and that (2) the Economy and Stafford acts be modified to improve the efficiency with which military aircraft respond to civilian wildfires.

| **14. SUBJECT TERMS** wildfire, aircraft, The Economy Act, The Stafford Act, Department of Defense, National Interagency Fire Center, homeland security, natural disaster | | | **15. NUMBER OF PAGES** 159 |
|---|---|---|---|
| | | | **16. PRICE CODE** |
| **17. SECURITY CLASSIFICATION OF REPORT** Unclassified | **18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified | **19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified | **20. LIMITATION OF ABSTRACT** UU |

NSN 7540–01-280-5500 Standard Form 298 (Rev. 2–89)
Prescribed by ANSI Std. 239–18

THIS PAGE INTENTIONALLY LEFT BLANK

**Approved for public release; distribution is unlimited**

# IMPROVING ACCESS TO MILITARY AIRCRAFT DURING CIVILIAN WILDFIRES

Steven E. Dubay
Deputy Fire Chief, Colorado Springs Fire Department
MPA, University of Colorado at Colorado Springs, 1998

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
(HOMELAND SECURITY AND DEFENSE)**

from the

**NAVAL POSTGRADUATE SCHOOL
December 2015**

Approved by: Dr. Carolyn Halladay
Thesis Advisor

Dr. Giannina Rikoski, Colorado Springs Fire Department (retired)
Second Reader

Dr. Erik Dahl,
Associate Chair for Instruction,
Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

# ABSTRACT

Wildfires are a growing problem in the United States, and military aircraft are increasingly mobilized in support of civilian wildfire suppression efforts. The photogenic qualities of aircraft distributing a trail of red "slurry" over a wildfire increase the public's expectation of fire suppression from the air. The problem is that Department of Defense (DOD) aircraft are not dispatched to civilian wildfires in a timely manner, resulting in lives lost, property destroyed, and critical infrastructure damaged. The research question considered by this thesis is, "What improvements can be implemented to existing local, state, and federal protocols to provide a more timely response to civilian wildfires by DOD aircraft?" The current system is complicated and confusing, involving federal laws, such as the Economy and Stafford acts; DOD doctrine and instruction, such as Defense Support to (of) Civil Authorities and Immediate Response Authority; and civilian agencies, such as the National Interagency Fire Center with its *Military Use Handbook* in the existing process to dispatch military aircraft to civilian wildfires. The results of the study recommend that (1) DOD aircraft be more closely coordinated with civilian aircraft via the IRA for responding to civilian wildfires, and that (2) the Economy and Stafford acts be modified to improve the efficiency with which military aircraft respond to civilian wildfires.

THIS PAGE INTENTIONALLY LEFT BLANK

# TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

# LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAR | After Action Report |
| ADF | Australian Defense Forces |
| AEG | Air Expeditionary Group |
| ATGS | Air Tactical Group Supervisor |
| AW | Air Wing |
| AWG | Aviation Working Group (Canada) |
| | |
| BAFB | Buckley Air Force Base |
| BFFR | Black Forest Fire Rescue |
| BIA | Bureau of Indian Affairs |
| BIFC | Boise Interagency Fire Center |
| BLM | Bureau of Land Management |
| | |
| CAB | Combat Aviation Brigade |
| CAF | Canadian Armed Forces |
| CAL FIRE | California Department of Forestry and Fire Protection |
| CFAC | Colorado Firefighting Air Corps |
| CFS | Canadian Forest Service |
| CIFFC | Canadian Interagency Forest Fire Centre |
| CJOC | Canadian Joint Operations Command |
| COANG | Colorado Air National Guard |
| COARNG | Colorado Army National Guard |
| CRS | Congressional Research Service |
| C.R.S. | Colorado Revised Statutes |
| CSFD | Colorado Springs Fire Department |
| CWN | Call When Needed |
| | |
| DACC | Defence Aid to the Civil Community (Australia) |
| DCO | Defense Coordinating Officer |
| DFACA | Defence Force Aid to the Civil Authorities (Australia) |
| DFPC | Division of Fire Prevention and Control (Colorado) |
| DHS | Department of Homeland Security |
| DOD | Department of Defense (also DOD) |
| DOI | Department of the Interior |
| DOJ | Department of Justice |
| DSCA | Defense Support to (of) Civil Authorities |
| | |
| EMAC | Emergency Management Assistance Compact |
| EPSO | El Paso County Sheriff's Office (Colorado) |

| | |
|---|---|
| FAA | Federal Aviation Administration |
| FAR | Federal Acquisition Regulations |
| FEMA | Federal Emergency Management Agency |
| FTA | Fire Traffic Area |
| | |
| GAO | Government Accountability Office |
| GACC | Geographic Area Coordination Center |
| GPS | Global Positioning System |
| | |
| HADR | Humanitarian Assistance and Disaster Response (Canada) |
| | |
| IA | Initial Attack |
| IAFC | International Association of Fire Chiefs |
| IAP | incident action plans |
| IASG | Interagency Aerial Supervision Guide |
| ID | Infantry Division |
| IGA | Intergovernmental Agreement |
| IHOG | Interagency Helicopter Operations Guide |
| IMT | Incident Management Team |
| IRA | Immediate Response Authority |
| IRPG | Interagency Response Pocket Guide |
| ISOG | Interagency Single Engine Air Tanker Operations Guide |
| | |
| JOSS | Joint Operations Support Staff (Australia) |
| | |
| LACFD | Los Angeles County Fire Department |
| LBD | Location Based Dispatching |
| LOFR | Liaison Officer |
| | |
| MAA | Mutual Aid Agreement |
| MAFFS | Modular Airborne Fire Fighting System |
| MARS | Mutual Aid Resource Sharing (Canada) |
| MMA | Multi-Mission Aircraft (Colorado) |
| MOU | Memorandum of Understanding |
| MSC | Military Strategic Commitments (Australia) |
| MSCA | Military Support to Civil Authorities |
| | |
| NAFC | National Aerial Firefighting Centre (Australia) |
| NAS | National Airspace System |
| NASF | National Association of State Foresters |
| NEMA | National Emergency Management Association |
| NFDRS | National Fire Danger Rating System |
| NGB | National Guard Bureau |
| NICC | National Interagency Coordination Center |
| NIFC | National Interagency Fire Center |

| | |
|---|---|
| NPS | National Park Service or Naval Postgraduate School |
| NRC | National Resources Canada |
| NRF | National Response Framework |
| NWCG | National Wildfire Coordinating Group |
| NWS | National Weather Service |
| | |
| OMB | Office of Management and Budget |
| OSD | Office of the Secretary of Defense |
| | |
| PAFB | Peterson Air Force Base |
| PPMJRSP | Pikes Peak Multi Jurisdictional Disaster Management Coordination and Resource Sharing Plan |
| | |
| RAAF | Royal Australian Air Force |
| RAN | Royal Australian Navy |
| RCAF | Royal Canadian Air Force |
| RCN | Royal Canadian Navy |
| RMA | Resource Management Agreement (Australia) |
| RRO | Rapid Response Operation (Canada) |
| | |
| SEAT | Single Engine Air Tanker |
| SRA | State Responsibility Area (California) |
| | |
| TCSO | Teller County Sheriff's Office (Colorado) |
| TFR | Temporary Flight Restriction |
| | |
| U.S. | United States |
| USA | United States Army |
| USAF | United States Air Force |
| U.S.C. | Unites States Code |
| USCG | United States Coast Guard |
| USDA | United States Department of Agriculture |
| USFA | United States Fire Administration |
| USFG | United States Fire Guard |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| USG | United States Government |
| USNORTHCOM | United States Northern Command (also NORTHCOM) |
| | |
| VLAT | Very Large Air Tanker |
| | |
| WUI | Wildland Urban Interface |

THIS PAGE INTENTIONALLY LEFT BLANK

# EXECUTIVE SUMMARY

Citizens and many local firefighters poorly understand the use of aircraft for wildfire suppression. There is a basic lack of knowledge because wildfires in general and the use of aircraft for fire suppression are both complex and expensive issues. Although the photogenic qualities of an aircraft with a trail of red "slurry" (retardant)[1] over a wildfire are well known, the use of aircraft is regulated by many variables. Some of those variables include laws, resource sharing agreements, weather, terrain, fire behavior, aircraft capabilities, and many others.

The National Interagency Fire Center (NIFC) is the agency with primary responsibility for coordinating the response to wildfire in the United States. The agency's homepage states, "The National Interagency Fire Center (NIFC), located in Boise, Idaho, is the nation's support center for wildland firefighting."[2] The NIFC also manages the response of aircraft to wildfire. The benefit of aircraft response to wildfire is that, "Air attack can be useful in delaying fire growth, or even suppressing small fires, before ground resources arrive."[3] Regardless, after water or retardant is dropped near a wildfire, firefighters on the ground must follow-up with additional measures to ensure that the fire is completely extinguished.

The United States Forest Service (USFS) and other federal agencies utilize aircraft to support personnel on the ground in wildfire suppression.[4] However, the national fleet of aircraft used for wildfire suppression is aging. According to a 2013 Government Accountability Office (GAO) study, "The average large air tanker is more

[1] National Wildfire Coordinating Group, *Glossary of Wildland Fire Terminology* (PMS 205) (Boise, ID: National Wildfire Coordinating Group, 2014), 78. Fire Retardant—Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

[2] "NIFC Home," accessed September 7, 2015, https://www.nifc.gov/.

[3] Edward G. Keating et al., *Air Attack Against Wildfires: Understanding U.S. Forest Service Requirements for Large Aircraft* (Arlington, VA: RAND Corporation, 2012), 9.

[4] Other federal agencies utilizing aircraft for wildfire suppression include the Bureau of Land Management (BLM), the Fish and Wildlife Service (USFWS), and the National Park Service (NPS).

than 50 years old"[5] Due in part to the small and aging USFS fleet, most firefighting aircraft, "Are obtained through contracts with private industry vendors."[6] In addition to federally owned and contractually operated aircraft, the Department of Defense (DOD) also has aircraft available for wildfire suppression.

Fighting wildfires is not the DOD's primary mission. However, both military helicopters and aircraft have been adapted to fight wildfires. Helicopters use a bucket suspended from a cable to drop water. C-130 military airplanes have been modified to fight wildfires with Modular Airborne Fire Fighting Systems (MAFFS). MAFFS units can discharge up to 3,000 gallons of water or fire retardant over a wildfire.[7]

The problem is that DOD aircraft are not dispatched to civilian wildfires in a timely manner, resulting in lives lost, property destroyed, and critical infrastructure damage, among other effects. This problem is the result of existing federal policies and long-term institutional inefficiencies. Current policy states that DOD aircraft are not dispatched to civilian wildfires until all USFS owned and/or contracted aircraft are engaged. This policy results in civilian aircraft responding from further distances when military aircraft are closer. The major research question is "What improvements can be implemented to existing local, state, and federal protocols to provide a more timely response to civilian wildfires by DOD aircraft?"

This thesis uses prescriptive research. Prescriptive research is similar to evaluative research but, "Goes a step further, beyond identifying success or performance or outcomes, and actually recommends solutions or new ideas. Prescriptive research (also known as normative research), comes up with an assertion, a solution, a proposal for how to address a known problem space."[8] The desired outcome of this prescriptive research is

---

[5] United States Government Accountability Office, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Success* (GAO-13-684) (Washington, DC: U.S. Government Accountability Office, 2013), 2.

[6] Ibid., 9.

[7] National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide* (NFES 002544, PMS 505) (Boise, ID: National Interagency Fire Center, 2014), 68.

[8] Lauren Wollman, *Research Paradigms*, Naval Postgraduate School video, Research Colloquium course, recorded summer 2008, 7:03, https://www.chds.us/coursefiles/research/lectures/research_paradigms/player.html.

to offer alternatives to the current system used for deploying military aircraft to civilian wildfires.

A system is in place that allows the USFS, state, and local governments to request, dispatch, and deploy military aircraft to civilian wildfires. However, this system must be updated to improve the efficiency of accessing DOD aircraft. This thesis suggests options to the current system of utilizing aircraft for wildfire suppression. One option is simply to maintain the existing system without modification. Another choice is to eliminate the use of DOD aircraft for response to civilian wildfires. In addition, this thesis suggests three options to improve the current system of utilizing DOD aircraft for wildfire suppression including (1) implement the DOD's Immediate Response Authority (IRA) to use military aircraft at the same time as civilian aircraft, (2) modify laws that establish barriers to the use of DOD aircraft, and (3) encourage the use of more resource sharing agreements between local jurisdictions and neighboring military installations.

The thesis concludes with two recommendations to improve the response of military aircraft to civilian wildfires. The recommendations are to (1) take greater advantage of the IRA to consider the use of military aircraft at the same time that civilian aircraft are dispatched, and (2) modify existing laws that negatively impact the use of DOD aircraft to civilian wildfires.

The first recommendation is that the DOD should be utilized as a "first responder" through the IRA. The advantage to this recommendation is that firefighting aircraft of any kind are dispatched as soon as a wildfire is known. Utilizing the military in this manner augments civilian resources. This change could be implemented without any changes to existing federal laws or military doctrine. The change would simply be procedural in nature, requiring an update to the deployment policies of the USFS and the DOD.

The second recommendation suggests that two federal laws could be updated to improve the efficiency of DOD aircraft deployment to civilian wildfires. The two laws are the Economy and Stafford Acts. The Economy Act has been in effect since 1932 and represents the United States government's (USG) long-standing desire to avoid

competition with private business. However, the law is written in a broad manner, stating specifically that an order for resources with another agency may be requested if the, "Ordered goods or services cannot be provided by contract as conveniently or cheaply by a commercial enterprise."[9] For many years, this phrase has been viewed as a restriction regarding the use of military aircraft. The Stafford Act includes the same bias to non-competition as the Economy Act.[10] This bias is problematic when considering specialized resources, such as aircraft. In addition, the Stafford Act restricts the time that federal resources can be deployed for emergencies to 10 days.[11] In the case of large wildfires, this timeframe is too restrictive, as many wildfires last much longer than 10 days.

[9] Money and Finance, 31 U.S.C. § 1535 (2003).

[10] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

[11] Ibid.

# ACKNOWLEDGMENTS

This thesis was made possible by many people to whom I am forever indebted. I appreciate the support, advice, patience, and confidence in me to complete this work.

First, and most importantly, I would like to thank my family. Thanks to Marta for your love and support. Thank you, too, for taking care of everything to keep our lives together while I was reading and writing. HLDCG, XOXO, HLDDB. Also, I would like to thank my parents for your unwavering support and love, and all that you did to help me become the man and husband that I am. I love you each of you dearly.

Next, I would like to thank my thesis advisor, Dr. Carolyn Halladay. Your steady guidance, trust, honest, and direct feedback helped me become a better student and a better writer. No drama. Thank you.

Thanks also to my friend and "second reader" Dr. Giannina "Nina" Rikoski. Thank you, Nina, for everything that you have taught me throughout the years. "Second reader" does not do justice to the work that you did to help me prepare this thesis. I appreciate your outstanding advice and support.

Dr. Halladay and Dr. Rikoski, this work is eminently better for the investment that each of you has made and I am the recipient of your efforts.

I would also like to thank each of the faculty members and all the students of 1403/1404 (1407!). It has been an honor to learn from each and every one of you.

Finally, thanks to Operations Coordinator Scott Martis, and all those "behind-the-scenes" staff at the Center for Homeland Security and Defense who make everything work; your unsung work is very much appreciated. Thank you, one and all!

THIS PAGE INTENTIONALLY LEFT BLANK

# I. INTRODUCTION

After the Hayman Fire of 2002,[1] the Colorado Springs Fire Department (CSFD) hosted a wildfire mitigation[2] seminar for citizens. When the presentations ended, a citizen approached me and asked why it took so long to use the aircraft equipped with MAFFS (Modular Airborne Fire Fighting Systems)[3] from neighboring Peterson Air Force Base (PAFB) to help fight the fire. My totally inadequate explanation was that due to current federal policies, Department of Defense (DOD) aircraft were not requested until all United States Forest Service (USFS) aircraft, including both aircraft owned by the USFS and aircraft contracted by the USFS, were in use. I explained that the existing federal policy was a contracting issue, and in general, the issue is a "non-compete" rule that prevented DOD assets from competing with (i.e., "taking money away from") civilian contractors. In the case of wildfires, DOD aircraft could not be utilized until all contracted aircraft were engaged.

The citizen thought my answer was completely ridiculous and told me so in no uncertain terms. His suggestion was that I should fix the problem. He remained angry and unconvinced when I explained that these policies were not something with which local government was directly involved. I further explained that it would be unlikely for a local government, such as the city of Colorado Springs, to influence this long-standing policy. Ten years later, after the Waldo Canyon Fire in 2012, a USFS report stated, "The community doesn't understand why we can't use the military resources; we need a better understanding of how the military can be involved."[4] This thesis, then, is a personal challenge concerned with how existing federal practices, policies, and procedures may be

---

[1] Russell T. Graham, ed., *Hayman Fire Case Study*, General Technical Report (RMRS-GTR-114) (Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 2003).

[2] "Wildfire Mitigation," April 3, 2014, http://csfd.coloradosprings.gov/public-safety/fire/prevention-and-safety/wildfire-mitigation.

[3] "Modular Airborne Firefighting System," December 17, 2012, http://www.302aw.afrc.af.mil/library/factsheets/factsheet.asp?id=4555.

[4] Bob Houseman et al., *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service* (Lakewood, CO: United States Forest Service, 2013), 10.

amended to address this citizen's concerns regarding the use of military aircraft during civilian wildfires.

Citizens and even many local firefighters poorly understand the use of aircraft for wildfire suppression. There is a basic lack of knowledge because wildfires in general and the use of aircraft to fight wildfire are complex and expensive issues. The citizen questioning why MAFFS-equipped aircraft were not deployed to the Hayman Fire suffered from this same lack of knowledge. For example, although the photogenic qualities of an aircraft with a trail of red "slurry" (retardant)[5] over a wildfire make for gripping news coverage and arouse the public's expectation of fire suppression from the air, the actual use of firefighting aircraft is contingent on many variables, including laws, resource sharing agreements, weather, terrain, fire behavior, and aircraft capabilities, among others.

Also, aircraft do not completely extinguish wildfires. Aircraft, whether rotor wing or fixed wing, or whether civilian aircraft or military aircraft, only limit the spread of wildfires. The benefit to aircraft response is that "Air attack can be useful in delaying fire growth, or even suppressing small fires, before ground resources arrive."[6] Regardless, after water or retardant is dropped near a wildfire, personnel on the ground must follow up with additional measures to ensure that the fire is extinguished. The costs involved with the use of aircraft, over and above the required cost of ground forces, dramatically add to the overall cost of wildfire suppression.

Still, regardless of the costs or limitations, in some situations, DOD assets could make a difference. Thus, I return to the question that the citizen asked me in 2002. Can the use of military aircraft to fight civilian wildfires be more efficient than the current model? For this thesis, I have researched a more efficient way for local communities to receive assistance from DOD aircraft (both fixed wing and rotor) during wildfire incidents. The outcome has suggested faster and more efficient yet safe and cost effective

---

[5] National Wildfire Coordinating Group, *Glossary of Wildland Fire Terminology* (PMS 205) (Boise, ID: National Wildfire Coordinating Group, 2014), 78. Fire Retardant—Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

[6] Edward G. Keating et al., *Air Attack Against Wildfires: Understanding U.S. Forest Service Requirements for Large Aircraft* (Arlington, VA: RAND Corporation, 2012), 9.

ways to deploy military aircraft to civilian wildfire emergencies than the system in use today. From a broader perspective, the research may more directly link local communities in the future to United States Northern Command **(**USNORTHCOM).[7] This research may also refine guidance for the DOD's Military Support to Civil Authorities (MSCA).[8] A final benefit might be that an updated system identifies a more effective tool for local communities to access other DOD assets during an "all-hazards" emergency.[9]

## A. THE PROBLEM

The problem is that DOD aircraft are not dispatched to civilian wildfires in a timely manner, resulting in lives lost, property destroyed, and critical infrastructure damage, among other effects. This problem is the result of existing federal policies and long-term institutional inefficiencies. The federal system by which firefighting aircraft are deployed and utilized has been in place for many years. Federal users of the system (primarily the USFS and the DOD) are familiar and comfortable with the arrangement. Local firefighters and government officials are less familiar with the system and are often confused and frustrated by this existing federal system.

Barriers are built into the current system for receiving timely assistance directly from DOD assets. One example of the barriers inherent in the existing system is that resource-sharing agreements between local, state, and federal governments, as well as with private contractors, are ubiquitous. These many agreements create confusion and are sometimes in conflict with one another. The lack of clarity leads to inefficiencies in dispatching the closest appropriate aircraft, civilian or military, to wildfires.

Another example of existing inefficiency is known as the "non-compete" rule. The requirement that all USFS aircraft are utilized before requesting DOD aircraft is the result of the 1932 Economy Act (31 U.S.C. § 1535). The Economy Act is the guidance by

---

[7] "Defending Our Homeland," December 6, 2014, http://www.northcom.mil/Home.aspx.

[8] United States Library of Congress, *Military Support to Civil Authorities: The Role of the Department of Defense in Support of Homeland Defense* (Washington, DC: United States Library of Congress, 2007). See for an overview of MSCA.

[9] Christopher Bellavita, "Changing Homeland Security: What Is Homeland Security?" *Homeland Security Affairs* 4, no. 2 (June 2008): 2, https://www.hsaj.org/articles/118. See "all-hazards" definition.

which one federal agency may purchase goods or services from another federal agency. All the requirements of the Economy Act must be met before military aircraft can be used in a wildfire environment.[10] The prerequisites limit the ability of the DOD to deploy resources, including aircraft, to wildfires.

Local citizens whose lives and property are being threatened by wildfires also misunderstand the dispatching of DOD aircraft to civilian wildfires. From a citizen's perspective, the closest aircraft equipped to fight wildfires ought to be deployed to their location regardless of whether the aircraft belongs to the USFS, the DOD, or to another entity. Citizens simply want help. During the Hayman Fire, for example, some citizens were outraged over the initial lack of response from the DOD (located less than 60 air miles from the fire) while waiting for USFS aircraft to arrive from much further away. As natural resources, homes, personal property, and infrastructure burned, confusion, frustration, anger, and complaints from citizens increased while the closer DOD aircraft remained on the ground.

The costs associated with the current situation, in terms of lives lost, natural resources damaged, homes and personal property burned, and critical infrastructure destroyed, vary from incident to incident depending on the location of the fire. In rural, undeveloped areas, the cost may only be to the natural resource, which has natural regenerative properties and which is beneficial for long-term forest health. In an undated pamphlet, CAL FIRE (the California Department of Forestry and Fire Protection) states, "Fire that is low in intensity and does not grow out of control benefits our wildlands and is actually vital to the survival of several species."[11] Wildfires in the wildland-urban

[10] Money and Finance, 31 U.S.C. § 1535 (1932), 152. The four requirements are (1) funds are available,( 2) the head of the ordering agency or unit decides the order is in the best interest of the United States government (USG), (3) the agency or unit to fill the order is able to provide or get by contract the ordered goods or services, and (4) the head of the agency decides ordered goods or services cannot be provided by contract as conveniently or cheaply by a commercial enterprise.

[11] "Benefits of Fire," accessed March 7, 2015, http://www.fire.ca.gov/communications/downloads/fact_sheets/TheBenefitsofFire.pdf.

interface (WUI),[12] however, can result in hundreds of millions of dollars in damages to property. For example, WUI fires in Colorado during 2012 resulted in $449.7 million in damages.[13]

## B. MAJOR RESEARCH QUESTION

It is frustrating for local officials, firefighters, and citizens to have resources available but not utilize them due to antiquated, bureaucratic rules. Understanding how government at all levels can help citizens during a crisis, in this case, during a wildfire, is the basis for this thesis. Given the lack of understanding within local government, among responders, and from citizens, this thesis researches questions to help improve the current situation.

The major research question contemplated is "What improvements can be implemented to existing local, state, and federal protocols to provide a more timely response to civilian wildfires by DOD aircraft?" Additional questions for this topic to help clarify and refine the research include the following.

- What recommendations can be made to modify existing federal law to improve local government access to military aircraft for responding to civilian wildfire emergencies?
- What improvements can be implemented within federal contracting requirements to simplify the use of military aircraft at civilian wildfire emergencies?
- How can National Wildfire Coordinating Group (NWCG) guidelines for utilizing military aircraft be modified to allow for faster response to local wildfire incidents?
- Can the civil-military interface in the United States (U.S.), specifically for the use of military aircraft during civilian wildfires, be improved based on the experiences of and examples from other countries?

---

[12] National Wildfire Coordinating Group, *Glossary of Wildland Fire Terminology* (PMS 205), 187. Wildland Urban Interface—The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.

[13] Andrew Wineke, "Waldo Canyon Fire Most Expensive in State History," *The Gazette*, July 17, 2012, http://gazette.com/waldo-canyon-fire-most-expensive-in-state-history/article/141783.

## C. RELEVANCE TO HOMELAND DEFENSE AND SECURITY

Annually, the United States experiences multiple wildfires within its approximately 751 million acres of forest.[14] According to the NIFC, the United States experienced 63,312 wildfires in 2014. Those fires burned 3,595,613 acres.[15] In addition to the number of fires and acres burned, lives are lost (both citizen's lives and firefighter's lives), homes and other personal property are burned, infrastructure (for example, utilities) is damaged or destroyed, and a great deal of money is spent in the control of wildfires. Gorte, in a 2013 research project for Headwaters Economics, reports that for the 10 years from fiscal year 2002 through fiscal year 2012, the U.S. Department of Agriculture (USDA) and the U.S. Department of the Interior (DOI) averaged $3.13 billion annually in wildfire suppression costs.[16]

The annual cost to suppress wildfires is growing. In 1994, the USFS spent approximately 16 percent of its annual budget for fire suppression. In 2015, fire suppression will consume an estimated 52 percent of the USFS budget. As reported in *USA Today* concerning 2015, "For the first time in its 110-year history, the U.S. Forest Service says it spends more than 50 percent of its annual budget on firefighting."[17] This cost does not include local and state spending for wildfire suppression. State spending on wildfire suppression, then, is reported to have doubled from 1998 to 2014, when $1.6 billion was spent.[18] Projections estimate that by 2025, the USFS will spend 67 percent of its budget to suppress wildfires.[19] Simply stated, wildfires are expensive.

---

[14] "Forestry—Facts and Figures," August 13, 2013, http://www.epa.gov/agriculture/forestry.html.

[15] "Total Wildland Fires and Acres 1960–2009," accessed May 30, 2015, http://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.

[16] Ross Gorte, "The Rising Cost of Wildfire Protection," *Headwaters Economics*, 2013, 4. The firefighting resources of the USDA are in the United States Forest Service (USFS) while the firefighting resources of the DOI are in the Bureau of Land Management (BLM), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (USFWS).

[17] Doyle Rice, "Wildfires Decimate U.S. Forest Service Budget," *USA Today*, August 6, 2015, http://www.usatoday.com/story/news/nation/2015/08/05/firefighting-costs-soar-blazes-worsen-west/31153701/.

[18] Christopher Topik, "Wildfires Burn Science Capacity," *Science* 349, no. 6254 (September 2015): 1263.

[19] Rice, "Wildfires Decimate U.S. Forest Service Budget."

One of the factors that contribute to the expensive cost of fighting wildfires is the use of aircraft. In the United States, both fixed wing (air tankers) and rotor wing (helicopters) are used in the suppression of wildfires. A 2013 Government Accountability Office (GAO) report identifies "flight hour rate" from $225 to $23,300 depending on the type of aircraft and the type of contract.[20] Based on these hourly rates, an eight-hour day of flying equates to a range of from $1,800 per day to $186,400 per day.[21]

The costs stand to rise. Wildfires are becoming more severe as noted by the fact that "The six worst fire seasons since 1960 have come since 2000."[22] In addition, the wildfire season is getting longer with reports varying that the season is from 42 to 78 days longer over the past 30 to 40 years. More and more people are also living in the WUI,[23] where reliance on aircraft to protect homes is growing.

The increase in wildfires and the cost to suppress them indicate that the use of DOD aircraft to assist in suppressing civilian wildfires may grow with the need. The cost of aircraft, however, is warranted based on their benefits to the suppression of a wildfire.

### 1. Aircraft and Wildfire: Pros and Cons

The USFS identifies seven benefits associated with the use of aircraft for fighting wildfires.

- Delivering equipment and supplies
- Transporting firefighters
- Deploying "smokejumpers" and rappellers
- Providing reconnaissance of fires
- Identifying specific fire locations and fire behavior

---

[20] United States Government Accountability Office, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Success* (GAO-13-684) (Washington, DC: U.S. Government Accountability Office, 2013), 42.

[21] Ibid.

[22] John Schwartz, "As Fires Grow, A New Landscape Appears in the West," *The New York Times*, September 21, 2015, http://www.nytimes.com/2015/09/22/science/as-fires-grow-a-new-landscape-appears-in-the-west.html?_r=0.

[23] Topik, "Wildfires Burn Science Capacity," 1263.

- Dropping "fire retardant or water to slow down a fire so firefighters can contain it"
- Igniting prescribed fires[24]

However, some negatives are associated with the use of aircraft during wildfires.

First, they are a dangerous tool, for the pilots and for firefighters on the ground. During 2002 and again in 2012, two accidents occurred in both years that resulted in fatalities.[25] Water or retardant striking firefighters from the air can also result in serious injuries and possibly death.

Second, the national fleet of aircraft used for wildfire suppression is aging and shrinking. According to a GAO study, "the average large air tanker is more than 50 years old."[26] Further, "The number of large airtankers available under federal contract decreased substantially in the last decade, from 44 in 2002 to 8 in early 2013."[27]

Third, aircraft is limited in effectiveness based on terrain and weather conditions. Depending on the type of aircraft, mountainous terrain cannot be traversed at the elevation needed to drop water or fire suppression retardant effectively. In addition, visibility, smoke conditions, and other factors contribute to the difficulty encountered flying at low altitude in mountains. Weather conditions, such as thunderstorms and high winds, also limit the ability of aircraft to fly during wildfires.

### 2. Use of Department of Defense Aircraft in Wildfires

Fighting wildfires is not the military's primary mission. However, both military helicopters and airplanes can be adapted to fight wildfires. Simply stated, helicopters use a bucket suspended from a cable to drop water. Military airplanes have been adapted to fight wildfires with MAFFS. MAFFS units are loaded onto C-130 aircraft that are then flown over wildfires where water, firefighting foam, or fire retardant is dropped.

---

[24] "Fire and Aviation Management—Aviation," November 15, 2014. http://www.fs.fed.us/fire/aviation/.

[25] United States Government Accountability Office, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Success*, 2.

[26] Ibid.

[27] Ibid., 1.

The use of military aircraft for wildfire suppression is one specific example of civil-military interface. The civil-military interface in the United States is guided by a complex variety of rules, regulations, and laws. Examples of policies and laws for utilizing DOD aircraft in wildfire suppression include the Posse Comitatus Act,[28] the Robert T. Stafford Disaster Relief and Emergency Assistance Act,[29] Immediate Response Authority,[30] the Economy Act,[31] and Defense Support of Civil Authorities,[32] among others.

This research and the resulting recommendations will be important to many audiences from a homeland security perspective. Relative to protecting the homeland, civilian leaders will be interested because they desire the support of military aircraft when wildfires are expanding beyond local capabilities. Citizens at risk from wildfires will be interested because they seek faster response from firefighting aircraft. Communities throughout the nation may be interested in this research, especially if DOD aircraft may be utilized to support a wider variety of local emergencies (not limited to wildfires). USFS personnel will be impacted by changes to their procedures. Military leadership will be interested because of the potential impact on their responsibilities, decision-making, and resource management. This research is also directly applicable to the DOD's Immediate Response Authority (IRA) "To save lives, prevent human suffering, or mitigate great property damage."[33]

---

[28] Posse Comitatus Act, 18 U.S.C. §1385.

[29] *The Robert T. Stafford Disaster Relief and Emergency Assistance Act*, Pub. L. No. 93–288, as amended.

[30] United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit* (GTA 90–01-021) (Washington, DC: Department of Defense, 2010), 3–3.

[31] The Economy Act of 1932, as amended, 31 U.S.C. § 1535.

[32] United States Department of Defense, *Department of Defense Directive Number 3025.18*, (Washington, DC: Department of Defense, 2010), 16.

[33] United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit*, 3–3.

## D. ASSUMPTIONS AND HYPOTHESIS

This thesis is bounded by two primary assumptions. First, it is assumed that wildfires are a problem of national interest from a homeland defense and security standpoint. Wildfires have been considered for use as a weapon by terrorist organizations.[34] Preparing for terrorism of any kind can limit damage, enhance recovery, and reduce fear. Both the DOD and civilian agencies are well-served by preparing for wildfires as an act of terrorism.

A second assumption, regardless of the cause of wildfires, is that the current system for deploying aircraft to wildfires can be improved and efficiencies can be identified. Generally, current policy states that DOD aircraft are not dispatched to civilian wildfires until all USFS owned and/or contracted aircraft are engaged. This policy results in civilian aircraft responding from further distances when military aircraft, either fixed wing or rotor wing, are geographically closer. The current system, limited by provisions of the Economy Act of 1932[35] and other regulations, may result in civilian lives lost, increased property damage, and destroyed natural resources. The current situation can be improved.

Efficiencies can also be gained from eliminating contradictions in policy. For example, while the Economy Act of 1932 limits the use of DOD aircraft by the USFS, DOD IRA instructs military commanders to respond for civil support, "…Under imminently serious conditions and if time does not permit approval from higher authority, … to save lives, prevent human suffering, or mitigate great property damage within the United States."[36]

Proposed changes to existing policies, identified as a result of this research, will support efforts to lessen the impact from wildfires. Analyzing previous local Colorado

---

[34] United States Department of Homeland Security et al., *Note: Terrorist Interest in Using Fire as a Weapon* (IA-0140-12) (Washington, DC: Department of Homeland Security, 2012), 3.

[35] Money and Finance, 31 U.S.C. § 1535 (2003).

[36] Deputy Secretary of Defense, *Defense Support of Civil Authorities (DSCA)*, DOD Directive 3025.18, Washington, DC: Deputy Secretary of Defense, 2010.

wildfire events[37] and their use of aircraft; reviewing the existing guidelines at the local, state, and federal levels; comparing the U.S. civil-military interface to other countries' use of military aircraft for wildfires; and proposing examples of different approaches, are used to support or refute this hypothesis.

## E. LITERATURE REVIEW

The literature review for this thesis incorporates data from existing information regarding DOD doctrine, including Defense Support to Civil Authorities (DSCA) and other relevant information; current policies and practices from civilian wildfire agencies; resource-sharing agreements, such as the use of the Emergency Management Assistance Compact (EMAC); and other similar agreements (such as mutual aid agreements (MAA), intergovernmental agreements (IGA), and memoranda of understanding (MOU)); information from Canada and Australia regarding the use of aircraft to attack wildfires; and finally, legal ramifications pertaining to the civil-military interface.

### 1. United States Department of Defense

The U.S. DOD utilizes a variety of missions to support civil authorities, including responding to civilian wildfires. These activities are highly regulated. The primary means by which the DOD provides rapid assistance to their neighboring communities is via the IRA. The IRA permits installation commanders to act outside of their installation boundary to "rapidly respond and provide immediate assistance to civil authorities and first responders in order to save lives, prevent human suffering, or mitigate great property damage."[38] Local DOD leadership may act to use their federal assets, including aircraft, without the permission of higher authority/command. The local response must not last more than 72 hours. One example providing specific directions for IRA are outlined in the *DSCA Taskbook: Tactical Level Commander and Staff Tool Kit*.[39] In addition to

[37] The three Colorado wildfire events reviewed are the Hayman Fire of 2002, the Waldo Canyon Fire from 2012, and the Black Forest Fire during 2013.

[38] Eric L. Leshinsky, "Prepared for Disaster? Improving the Department of Defense's Immediate Response Authority" (master's thesis, Naval Postgraduate School, 2006), 57.

[39] United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit*, 3–3.

wildfires, deployments from military installations to support civil authorities via immediate response include blizzards, flooding, pandemic, and other situations that overwhelm the local population.

Another method by which the DOD may assist local populations is via DSCA. DSCA is regulated by DOD Directive 3025.18 and is defined by Directive 3025.18 as:

> Support provided by U.S. Federal military forces, DOD civilians, DOD contract personnel, DOD Component assets, and National Guard forces (when the Secretary of Defense, in coordination with the Governors of the affected States, elects and requests to use those forces in title 32, U.S.C., status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. Also known as civil support.[40]

The phrase, "For domestic emergencies, law enforcement support, and other domestic activities" in this broadly written directive appears to provide an avenue for requesting the use of military aircraft during wildfires.

Contrasting the IRA and DSCA, both the IRA and the DSCA provide support to civilian authorities, but provide that civilian support differently. The IRA does not have to be a written request, is not dependent on the ability to reimburse for services, and generally, is a short-term arrangement lasting less than 72 hours. DSCA requires a written request, includes reimbursement per the Stafford Act, and could be utilized for a longer term than 72 hours.[41] While the IRA and DSCA both permit the military to respond to civilian emergencies, the IRA allows action more quickly but for a shorter duration as compared to DSCA, which is more cumbersome to employ but once established, authorizes support for a longer duration.

The DOD also works closely with the DOI and the USDA. Working together, the DOD, DOI, and USDA have entered into an interagency agreement to provide temporary

---

[40] United States Department of Defense, *Department of Defense Directive Number 3025.18*, 16.

[41] United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit*, 3–5.

support of DOD assets for response to civilian wildfires.[42] Titled *Interagency Agreement for the Provision of Temporary Support during Wildland Firefighting Operations*, this agreement is administered by the National Interagency Fire Center (NIFC), located in Boise, ID, and staffed with representatives from multiple federal agencies, including the DOD. Similar to DSCA requests, the activation of this agreement must be in writing and must provide for reimbursement.[43] The agreement does provide for the use of DOD aircraft capable of performing a wildfire suppression mission. Examples are helicopters capable of providing water bucket operations and aircraft with the ability to support MAFFS operations.[44]

### 2. Civilian Wildfire Agencies

The U.S. civilian response to wildfires is organized by many federal agencies. These agencies provide an avenue for research regarding the use of military aircraft in support of wildfire suppression. Examples of civilian agencies directly involved in responding to wildfires are the NWCG, the NIFC, and many others.

The NWCG is comprised of multiple civilian federal agencies including the USFS, the BLM, the NPS, the Bureau of Indian Affairs (BIA), and the USFWS. In addition, the National Association of State Foresters (NASF), the Intertribal Timber Council, the International Association of Fire Chiefs (IAFC), and the United States Fire Administration (USFA) are all represented in the NWCG.[45]

The NWCG through its member agencies provide guidelines, training, and coordination regarding the use of both civilian and military resources during wildfire emergencies in its mission statement. The NWCG's mission statement states:

> The National Wildfire Coordinating Group (NWCG) provides national leadership to develop, maintain, and communicate interagency standards,

[42] United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense, *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*, DOI (BLM-FAD) Agreement No. L10PG00548, USDA (USFS-NIFC) Agreement No. 10-IA-11130206-008 (Washington, DC: National Interagency Fire Center, 2010), 1.

[43] Ibid., 2.

[44] Ibid., 3.

[45] "Members," accessed August 30, 2015, http://www.nwcg.gov/.

> guidelines, qualifications, training and other capabilities that enable interoperable operations among federal and non-federal entities.[46]

The NWCG is also well-versed in the use of aircraft for wildfire suppression, both civilian and military. The use of aircraft has long been a strategy in combating wildfire. In an August, 2013 report, the GAO reports in its opening statement:

> Over the last 5 (five) decades, aircraft have played an important role in wildland fire suppression activities throughout the country by conducting aerial surveillance, delivering supplies and firefighters, and dropping retardant to slow fire growth or water to suppress fires.[47]

The NWCG has been involved in the wildfire for those same five decades since its establishment in 1976. Another federal agency that supports the national response to wildfire since its inception in 1965 is the NIFC.[48]

The NIFC is experienced in the use of all types of DOD assets for wildfire suppression. In the past, DOD assets, such as soldiers, fire trucks, aircraft, and other equipment, have all been used in support of civilian emergencies involving wildfires. From the NIFC's past experiences, and to guide the future deployment of military resources, the NIFC has developed a *Military Use Handbook*. The *Military Use Handbook* is comprehensive and includes Chapter 70–Aviation.[49] As stated therein, "The goal of this chapter is to facilitate the use of military aviation and associated resources."[50] Further, USNORTHCOM is referenced in this chapter.[51]

With its long history, the federal civilian wildfire community has utilized strategic planning to guide their "… Comprehensive national aviation strategy" as noted in the

---

[46] "Mission," accessed August 30, 2015, http://www.nwcg.gov/.

[47] Anne-Marie Fennell, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success* (GAO-13-684) (Washington, DC: U.S. Government Accountability Office, 2013), 1.

[48] "History," accessed August 30, 2015, https://www.nifc.gov/aboutNIFC/about_mission.html.

[49] National Interagency Fire Center, *Military Use Handbook* (Boise, ID: National Interagency Fire Center, 2006), 37. The individual chapters in the handbook are labeled Chapter 10—General, Chapter 20—Resource Ordering Procedures for Military Assets, Chapter 30—NIFC Advance Party, et cetera through Chapter 100—Incident Business Management.

[50] Ibid.

[51] Ibid.

USDA's 2006 report titled *Comprehensive National Strategy for the Use of Aviation Resources in Wildland Fire Management.*[52] It is interesting to note that while the report mentions that it was developed with "state and military partners," additional recognition of military aircraft is limited. The MAFFS aircraft available in the United States are included in a table outlining a variety of aircraft types available to civilian wildfire agencies, but DOD assets, agreements, or use is not mentioned further.[53]

### 3. Resource Sharing Agreements

Another area of research contemplated in the literature review considers the many different types of agreements established by and between governmental agencies. For example, MAAs are regularly addressed in the U.S. Department of Homeland Security's (DHS) *National Response Framework* (NRF).[54] As noted in the NRF, agreements to share resources have been established between local governments, between state governments, and between federal government agencies. In general, if an arrangement to share resources can be beneficial to both parties, a wide variety of agreements can be established between combinations of eligible governmental entities. Legal review of any agreement is appropriate and necessary prior to governmental agencies entering into an agreement.

One example of a resource sharing agreement is a "state-to-state" agreement established to share resources during a disaster, known as the EMAC. Bruce Lindsay, in a 2008 Congressional Research Service (CRS) report, states, "The Emergency Management Assistance Compact (EMAC) is a congressionally ratified interstate mutual

---

[52] United States Department of Agriculture, *Comprehensive National Strategy for the Use of Aviation Resources in Wildland Fire Management* (Washington, DC: United States Department of Agriculture, 2006), 4. The document states that, "It provides long term strategic direction for how federal aviation resources, in an interagency manner, will be procured, operated and managed of (sic) the next 15 to 20 years."

[53] Ibid., 2, 7.

[54] United States Department of Homeland Security, *National Response Framework* (Washington, DC: Department of Homeland Security, 2013).

aid compact that provides a legal structure by which states affected by a catastrophe may request emergency assistance from other states."[55]

The U.S. Department of Justice (DOJ) has developed a sample federal government agreement.[56] Although the DOJ's MOU is a template written specifically for grants, numerous elements are applicable to resource-sharing agreements. Included are headings. such as "Description of Partner Agencies," "History of Relationship," and "Roles and Responsibilities," among others.[57] Additional agreements and their contents should be reviewed by governmental entities that desire to enter into agreements of any type.

Further examples of written agreements for sharing resources between all levels of government are available that require additional research. An interesting and historical document in my region, although no longer in use, was the Pikes Peak Multi Jurisdictional Disaster Management Coordination and Resource Sharing Plan (PPMJRSP). The signatories to the agreement included multiple municipal governments, one county government, and four regional DOD installations (one U.S. Army and three U.S. Air Force facilities).[58]

Regarding agreements involving the DOD and local government, a DOD Inspector General Report identifies both pros and cons from the responses to wildfires in California during 2007 and 2008. Regarding the use of mutual aid for wildfire response, the report states that the DOD may, "Enter into reciprocal fire protection agreements with fire organizations maintaining fire protection facilities in and near the vicinity of property

---

[55] Bruce Lindsay, *The Emergency Management Assistance Compact (EMAC): An Overview* (CRS Report No. RL 34585) (Washington, DC: Congressional Research Service, 2008), 1.

[56] United States Department of Justice, *Sample Memorandum of Understanding* (Washington, DC: n.d.).

[57] Ibid. Other headings in this agreement include "Timeline" and "Commitment to Partnership."

[58] The PPMJRSP agreement is no longer in effect; however, when active it included the cities of Colorado Springs and Fountain, Colorado; El Paso County, Colorado; and United States Army Fort Carson, United States Air Force Peterson Air Force Base, Schriever Air Force Base, and Cheyenne Mountain Air Force Base.

of the United States."[59] The same DOD Inspector General report, however, states the "DOD lacks appropriate plans, guidance, and agreements with local authorities to disengage immediate response resources and transfer the support back to civil authorities."[60] The DOD Inspector General's report suggests that improvements to the existing systems, for both local governments and the DOD, may be advanced.

### 4. Legal Implications

The civil-military interface is not without legal concerns. Many federal laws impact response to disasters. Examples include the Insurrection Act (1807), the Posse Comitatus Act (1878), the Economy Act (1932), the Disaster Relief Act (1974), the Robert T. Stafford Disaster Relief and Emergency Assistance Act (1988), the National Response Framework (2008), and others.

The Posse Comitatus Act has a significant effect on the military's ability to respond to civilian emergencies. Codified in 18 U.S.C. § 1385, "posse comitatus" as it is commonly known, states:

> Whoever, except in cases and under circumstances expressly authorized by the Constitution or Act of Congress, willfully uses any part of the Army or Air Force as a posse comitatus, or otherwise to execute the laws shall be fined under this title or imprisoned not more than two years, or both.[61]

Jennifer Elsea, in a CRS report, states that the act has previously been considered and approved by Congress during disasters, "Particularly in cases where the armed forces provide civilian assistance without becoming directly involved in civilian law enforcement."[62] Elsea's brief statement appears to be applicable to wildfire situations.

---

[59] United States Department of Defense Inspector General, *DOD Civil Support during the 2007 and 2008 California Wildland Fires* (D-2010-015) (Arlington, VA: Department of Defense Inspection General, 2009), 6.

[60] Ibid., 31.

[61] Jennifer K. Elsea, *The Posse Comitatus Act and Related Matters: A Sketch* (CRS Report No. R42669) (Washington, DC: Congressional Research Service, 2012), Summary.

[62] Ibid.

Next, the Economy Act (31 U.S.C. § 1535) was established in 1932 to permit one federal agency to purchase goods and/or services from another federal agency. It is still in effect today and arguably has the most impact on the use of military aircraft during civilian wildfire events. Specifically, the act outlines four requirements that must be met before goods and/or services are provided:

> (1) amounts (funds) are available; (2) the head of the ordering agency or unit decides the order is in the best interest of the United States Government; (3) the agency or unit to fill the order is able to provide or get by contract the ordered goods or services; and (4) the head of the agency decides ordered goods or services cannot be provided by contract as conveniently or cheaply by a commercial enterprise.[63]

Before the USFS can call on the DOD for the assistance of military aircraft during civilian wildfire events, these four provisions must be interpreted and applied.

In 2003, the Economy Act was amended to specifically address wildfires. The 2003 amendment is titled, "*Review and Enhancement of Existing Authorities for Using Air Force and Air National Guard Modular Airborne Fire-fighting Systems and Other Department of Defense Assets to Fight Wildfires*." The review directed the Office of Management and Budget (OMB) to affirm that, "Assets are available in the most expeditious manner to fight wildfires on Federal lands or non-Federal lands at the request of a Federal agency or State government."[64] The OMB provided the report as directed in May 2004. The report indicated that there did not appear to be any hardships due to the Economy Act for the delivery of wildfire suppression. The report did state, though, "That the requesting agencies must determine that all commercial aviation resources are fully committed before requesting military assistance. This formulation is more stringent than what the Economy Act requires."[65]

Another law that affects response to disasters, including wildfires, is the Robert T. Stafford Disaster Relief and Emergency Assistance Act ("Stafford Act") (42 U.S.C. §

---

[63] Money and Finance, 31 U.S.C. § 1535 (1932), 152.

[64] Ibid., 154.

[65] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires* (Washington, DC: Office of Management and Budget, 2004), 1.

5121). Established in 1998, the Stafford Act "Authorizes the President to issue major disaster, emergency, and fire management declarations, which in turn enable federal agencies to provide assistance to state and local governments overwhelmed by catastrophes."[66] Prior to a disaster occurring, one provision of the Stafford Act permits the President to "Direct the Department of Defense (DOD) to commit resources for emergency work essential to preserve life and property in 'the immediate aftermath of an incident' that may result in the declaration of a major disaster or emergency."[67] In addition, specifically regarding wildfire emergencies:

> The Stafford Act authorizes the President to provide fire management assistance in the form of grants, equipment, personnel, and supplies to supplement the resources of communities when fires on public property or on private forests or grasslands threaten destruction that might warrant a major disaster declaration.[68]

Both "prior to the disaster" authorizations have a direct impact on the response to wildfires by civilian and DOD responders.

### 5. Canada and Australia

Both Canada and Australia annually experience significant wildfire events, similar to that experienced in the United States. Can the United States, then, learn anything from the civil-military interface employed during Canadian and Australian wildfires?

Since 1982, Canada has experienced between 4,000 and 13,000 wildfires annually through 2014. During 2002, Canada endured approximately 8,000 wildfires.[69] Similarly, Australia with its hot and dry climate sustains thousands of bushfires each year. For 2002,

---

[66] Francis X. McCarthy, *Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding* (CRS Report No. RL33053) (Washington, DC: Congressional Research Service, 2011), 1.

[67] Ibid., 9.

[68] Ibid.

[69] "Fires by Year" (graph), May 14, 2014, http://www.ciffc.ca/images/stories/FiresByYears.GIF.

Australia reported approximately 6,000 bushfires.[70] The Canadian Forest Service (CFS), an agency of Natural Resources Canada (NRC), is the organization responsible for maintaining the health of Canada's forests.[71] In Australia, the Forestry section of the Department of Agriculture is responsible for forest health.[72] The use of aircraft during wildfires is managed respectively by the Canadian Interagency Forest Fire Centre (CIFFC)[73] and by the National Aerial Firefighting Centre (NAFC)[74] in Australia. However, neither the Royal Canadian Air Force (RCAF) nor the Royal Australian Air Force (RAAF) provides aircraft directly for wildland firefighting. The RAAF specifically states that their force, "Does not maintain the aircraft or equipment for aerial bush fire fighting."[75] Both countries' air forces, however, provide other types of support, such as citizen evacuation and the delivery of supplies via aircraft. These acts are undertaken with the authority of the civil-military interface in their respective countries.

The Canadian and Australian systems for deploying military aircraft to civilian wildfires and other emergencies are outlined in Appendix B.

## F. METHODS AND SOURCES

This thesis uses prescriptive research, which is similar to evaluative research in which "Evaluative research is concerned with the assessment of policies, programs or institutional frameworks."[76] However, prescriptive research "Goes a step further, beyond identifying success or performance or outcomes, and actually recommends solutions or new ideas. Prescriptive research (also known as normative research), comes up with an

---

70 "Bushfires," March 24, 2006, http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/CCB3F2E90BA779D3CA256DEA00053977?opendocument.

71 "Forests," accessed March 25, 2015, http://www.nrcan.gc.ca/forests.

72 "Forestry," accessed April 18, 2015, http://www.daff.gov.au/forestry.

73 "Welcome to CIFFC," accessed May 18, 2015, http://www.ciffc.ca/.

74 "Welcome to the National Aerial Firefighting Centre," accessed May 18, 2015, http://www.nafc.org.au/portal/.

75 "Humanitarian Support," accessed May 17, 2015, http://www.airforce.gov.au/Operations/Humanitarian-support/?RAAF-hruuHkflEaNxq4BtnrEKSQz5XM3LaPec.

76 Lauren Wollman, *Research Paradigms*, Naval Postgraduate School video, Research Colloquium course, recorded summer 2008, 7:03, https://www.chds.us/coursefiles/research/lectures/research_paradigms/player.html.

assertion, a solution, a proposal for how to address a known problem space."[77] The desired outcome of this thesis is to offer alternatives to the current system used for deploying military aircraft to civilian wildfires.

Multiple sources of data were used for this thesis. The primary documents used to research this topic are official policy, procedures, doctrine, and directives from various agencies. Examples are policies for the deployment of resources that currently reside within both the DOD and the USFS. Additional primary documents are existing policies and agreements from the various types of intergovernmental agreements[78] that provide for the sharing of resources. Further sources include governmental reports from research organizations, such as the GAO and the CRS,[79] after action reports (AAR)[80] from historical wildfire events, and legal documents, among others. Finally, another primary source is information obtained from personal communication with practitioners in the field.

Secondary sources of information for this research include books and other similar literature regarding the use of aircraft in wildfires. One example of a book that may be relevant to the topic is *Wildland Firefighting: Fire Behavior, Tactics, and Command*[81] and its air resources chapter. Most of these types of references are tactical in nature, however, and do not reference deployment policies.

As noted, personal communication contributed to this topic. Discussions with experienced practitioners have provided specific information regarding the current system for deploying military aircraft to civilian wildfires. For example, the NIFC

---

[77] Wollman, *Research Paradigms*.

[78] One example of a federal intergovernmental agreement is the *Interagency Agreement for the Provision of Temporary Support during Wildland Firefighting Operations among the United States Department of the Interior, the Unites States Department of Agriculture, and the United States Department of Defense*.

[79] For example, the GAO's report *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success* (GAO-13-684) and the CRS report *The Posse Comitatus Act and Related Matters: A Sketch* (R42669).

[80] An example is Russell T. Graham's *Hayman Fire Case Study* (General Technical Report RMRS-GTR-114).

[81] Donald G. Perry, *Wildland Firefighting: Fire Behavior, Tactics, and Command* (Bellflower, CA: Fire Publications, Incorporated, 1990).

maintains a Defense Coordinating Officer (DCO)[82] for working with military assets. A current staff member provided practical insight into the way the system works within existing policy. In addition, information from the public affairs office and MAFFS program personnel at Peterson Air Force Base, Colorado, both experienced in wildfire deployments, offered their insight.

Based on historical review, the current systems in use, and relevant metrics, this thesis identifies specific policy recommendations to develop a new approach for deploying DOD aircraft to civilian wildfires. These recommendations will have implications for the DOD, the USFS, the NWCG, the NIFC, state officials, and local responders.

## G. OVERVIEW

Chapter II reviews recent historical wildfire events in the Pikes Peak region of Colorado, specifically focusing on the use of aircraft to suppress those fires. Three particular wildfires are reviewed: the Hayman Fire from 2002, the Waldo Canyon Fire that burned during 2012, and the Black Forest Fire that occurred in 2013. Each incident included the use of civilian and military aircraft to suppress the fires. The timing and use of military aircraft, however, were different for each fire.

Chapter III details the current approach to utilizing aircraft in the suppression of wildfire. The current process is analyzed from a variety of perspectives. Existing policies and procedures that guide the DOD, the USFS, and the NWCG is presented. Chapter III also considers present resource sharing agreements at the federal, state, and local levels. MAAs, MOUs, IGAs, and the EMAC are reviewed to demonstrate their efficacy for use between local governments and the DOD. Finally, legal requirements that impact the use of DOD aircraft during civilian wildfires (essentially, the impact of the civil-military interface) are presented.

Chapter IV suggests options to the way that DOD aircraft are deployed to civilian wildfires. One possibility is to leave the system in tact as it exists today. Another

[82] "Region II: Defense Coordinating Officer," accessed February 8, 2015, https://www.fema.gov/site-page/region-iii-news/defense-coordinating-officer.

possibility is to eliminate the use of military aircraft in responding to civilian wildfires. Opportunities for improving the current system are also available. In addition, this chapter reviews the pros and cons of the options identified as a result of this research.

Chapter V provides the conclusions that have developed because of this research. Included is a brief analysis of the current and suggested systems. The chapter concludes with recommendations for improving the deployment of military aircraft to civilian wildfire and suggestions for future research.

Appendix A presents the history and current use of both civilian and military aircraft in the suppression of wildfires, including a review of fixed wing and rotor wing suppression capabilities and effectiveness, training, and guidelines for the use of aircraft during wildfires, and aircraft safety.

Finally, Appendix B is a brief comparative analysis of the civil-military interface employed during wildfires by both Canada and Australia. The extensive wildfire experiences from these two countries provide insight into possible research opportunities for the U.S. system of deploying DOD aircraft to civilian wildfires.

THIS PAGE INTENTIONALLY LEFT BLANK

# II. WILDFIRE AND AIRCRAFT CASE STUDIES

Wildfires are a fact of life in the United States and other countries. The Pikes Peak region of Colorado has experienced catastrophic wildfires. Three specific examples from south central Colorado are the Hayman Fire, the Waldo Canyon Fire, and the Black Forest Fire. In addition to USFS and commercially contracted helicopters and air tankers, military aircraft were also used to suppress these fires. However, military aircraft were deployed at different times and by different methods. These case studies describe the current system for how DOD aircraft are deployed to civilian wildfires and demonstrate how this system can and should be improved.

## A. HAYMAN FIRE—2002

The largest fire in Colorado history[83] and what came to be known as the Hayman Fire was first reported on Saturday, June 8, 2002 at approximately 5 p.m.[84] The fire was ignited by a USFS employee who asserted that she had burned a letter regarding a personal relationship in a campfire ring, accidently starting the fire, six miles northwest of Lake George, Colorado, in Park County.[85] Lake George is approximately 40 miles northwest of Colorado Springs and 100 miles southwest of Denver in south central Colorado.

By the time the fire was under control on June 28, 2002, the fire had burned 138,114 acres, 132 homes, and 466 outbuildings; damaged utility infrastructure including watershed, natural gas distribution pipelines, electrical substations, poles, and wires; recreation areas; and natural resources (timber). The fire resulted in the evacuation of over 5,300 persons.[86] In addition, response to the Hayman Fire resulted in the deaths of

---

[83] "Colorado's Largest Wildfires (Burn Area)," June 25, 2012, http://www.denverpost.com/ci_20934186/colorados-largest-wildfires-burn-area.

[84] Graham, ed. *Hayman Fire Case Study*, 4.

[85] John Ingold, "Decade after Hayman Fire, Questions Linger about Fire's Start," *The Denver Post*, June 3, 2012, http://www.denverpost.com/ci_20769983/decade-after-hayman-fire-questions-linger-about-fires.

[86] "Hayman Fire: Hayman, Colorado (Case Study)," accessed August 22, 2015, https://www.planning.org/research/postdisaster/casestudies/haymanfire.htm.

six persons. One resident died due to an asthma attack when exposed to smoke conditions and five firefighters were killed in a traffic accident while traveling from Oregon to fight the fire.[87]

The fire was ultimately extinguished on July 18, 2002, 41 days after it was first reported. The cost to suppress the fire, including the use of aircraft, was approximately $39,100,000.[88] The total economic impact of the Hayman Fire including property value loss, lost retail and recreational business, lost productivity, and increased water treatment costs, is difficult to assess. The *Hayman Fire Case Study* reports that, "Clearly, fully characterizing all of the monetary and nonmonetary impacts from the Hayman Fire especially in advance of when they occur will be difficult."[89]

Although a variety of aircraft were used in the suppression of the Hayman Fire, including both fixed wing air tankers and helicopters, some citizens criticized the lack of response from the DOD. Their concern was that military aircraft were not requested soon enough, especially given their proximity to the fire. C-130 aircraft equipped with MAFFS were available from PAFB, Colorado while helicopters were available from Fort Carson, Colorado, both located near Colorado Springs and approximately 50 miles away from the origin of the fire. The first military aircraft, two C-130 aircraft equipped with MAFFS from the 302nd AW at PAFB, did not arrive until June 14, six days after the fire started.[90] During the Hayman Fire, MAFFS equipped military aircraft flew a total of 22 hours and dropped 113,000 gallons of retardant.[91] Military helicopters did not respond to the Hayman Fire.

USFS-owned and commercially contracted helicopters responded to the Hayman Fire on June 8, the day the fire was reported, including one Type I helicopter and one Type III helicopter. However, they were moved from the Hayman Fire to other fires in

---

[87] "Hayman Fire: Hayman, Colorado (Case Study)."

[88] Graham, ed. *Hayman Fire Case Study*, 315.

[89] Ibid., 315–316.

[90] R. Scott Rappold, "10 Years Later: A Timeline of the Hayman Fire," *The Gazette*, June 1, 2012, http://gazette.com/10-years-later-a-timeline-of-the-hayman-fire/article/139582.

[91] Graham, ed. *Hayman Fire Case Study*, 133.

the area from June 9 through June 11. On June 12, helicopters returning to the Hayman Fire included five Type I and one Type III helicopters. At its peak, helicopter operations on the Hayman Fire included 14 Type I helicopters, three Type II helicopters, and five Type III helicopters.[92] These helicopters were used to drop water, firefighting foam, and fire retardant; to transport personnel and cargo; to conduct reconnaissance; and to provide infrared and global positioning system (GPS) mapping.[93] As noted, however, none of the helicopters were from the DOD.

Fixed wing air tankers also responded to the Hayman Fire. On June 9, two air tankers were assigned to the Hayman Fire. The report does not specify what "type" air tanker(s) responded; just that tankers were assigned.[94] The largest number of air tankers that responded was twelve.[95] Like the helicopters, air tankers were also diverted to other incidents. The *Hayman Fire Case Study* reports, "On several occasions during the Hayman Fire air tankers were diverted to the Missionary Ridge Fire."[96] Further, commercial air tankers were grounded on June 18, "Due to a mandatory stand-down following the crash of a C-130 air tanker" at a fire in Nevada. The C-130 that crashed was not a military tanker. USFS air tankers resumed flying on June 19. MAFFS equipped military air tankers were available on June 18.[97]

## B. WALDO CANYON FIRE—2012

The Waldo Canyon Fire was reported on Saturday, June 23, 2012 at approximately noon and was reported to be fully contained on July 10, 2012. "The fire

---

92 Graham, ed. *Hayman Fire Case Study*, 175.

93 Ibid., 133.

94 National Wildfire Coordinating Group, *Glossary of Wildland Fire Terminology*, 178. "Type" refers to resource capability. A Type 1 resource provides a greater overall capability due to power, size, capacity, etc., than would be found in a Type 2 resource. Resource typing provides managers with additional information in selecting the best resource for the task.

95 Graham, ed. *Hayman Fire Case Study*, 176.

96 Ibid., 132.

97 Ibid.

burned 18,247 acres over 19 days"[98] The fire was located, "Approximately three miles west of the city of Colorado Springs" "In the Pike National Forest"[99] The fire was about 14 miles from PAFB and around 12 miles from Fort Carson. An estimated 26,000 persons were evacuated on June 26 when the fire entered the city of Colorado Springs.[100] Two residents lost their lives and 345 homes were destroyed.[101] No firefighters were killed during the suppression of the Waldo Canyon Fire. As occurred during the Hayman Fire and other large wildland fires, infrastructure, such as utilities, watershed, timber, and recreation areas, were destroyed. The cost of suppression for the USFS, the city of Colorado Springs, and Colorado Springs Utilities, including the use of aircraft, was approximately $20,000,000.[102] Total economic loss was estimated at $353,000,000.[103]

The USFS incident management team (IMT) reports the cost to suppress the Waldo Canyon Fire was $15,702,512. Aircraft expenses were approximately 20 percent of the total, or $3,204,362.[104] A review of the IMT's incident action plans (IAP) identifies the specific aircraft involved in the effort to suppress the Waldo Canyon Fire. Aircraft utilized included heavy air tankers including DOD C-130s with MAFFS, SEATs, civilian and military helicopters, lead airplanes, and Air Tactical Group Supervisor (ATGS) airplanes.[105] Lead airplanes fly over the area to guide heavy air tankers while ATGS airplanes fly at an elevation much higher than the other aircraft and serve as an "airborne air mission coordination platform."[106] Throughout the course of the fire, a total

---

[98] City of Colorado Springs, *Waldo Canyon Fire Initial after Action Report* (Colorado Springs, CO: City of Colorado Springs, 2012), 4.

[99] Ibid., 5.

[100] Ibid., 6.

[101] Ibid., 5.

[102] Wineke, "Waldo Canyon Fire Most Expensive in State History."

[103] Ibid.

[104] National Incident Management Team, Great Basin Team 2, Rich Harvey, Incident Commander, *Waldo Canyon Fire Narrative Summary* (CO-PSF-000636, P2GY3N) (Colorado Springs, CO: National Incident Management Team, Great Basin Team 2, 2012). NOTE: This document is from the author's private collection.

[105] All incident action plans (IAP) from the Waldo Canyon Fire are from the author's personal collection.

[106] Federal Aviation Administration, *Airspace Management Plan for Disasters* (Washington, DC: Federal Aviation Administration, 2012), 14.

of six Type I helicopters were used (one was a military helicopter from the Colorado Air National Guard (COANG) located at Buckley Air Force Base (BAFB) in Aurora, Colorado), three Type II helicopters, three Type III helicopters, six heavy air tankers, three DOD C-130s with MAFFS, three single engine air tankers (SEAT), four lead airplanes, and three ATGSs.[107] During the Waldo Canyon Fire, helicopters flew a total of 280.4 flight hours, and dropped 920,119 gallons of water and 153,258 gallons of fire retardant. Air tankers (heavy air tankers, SEATs, and MAFFs) flew 305.1 hours, and dropped 320,214 gallons of fire retardant.[108] Regarding this effort, the USFS *Waldo Canyon Fire Review* stated, "As expected, there was a heavy emphasis on tactical air support from fixed and rotor-wing aircraft, particularly in the WUI but also to support perimeter control operations."[109]

Similar to the crash of a privately operated C-130 in Nevada that occurred during the Hayman Fire, DOD aircraft fighting the Waldo Canyon Fire were grounded due to the crash of a C-130 air tanker equipped with MAFFS that occurred on a wildfire in South Dakota.[110]

The DOD was engaged in the Waldo Canyon Fire faster than during the Hayman Fire. The city of Woodland Park, Colorado in its AAR, reports on June 25, 2012 (Monday) at 8 a.m. to "Expect Modular Airborne Fire Fighting System (MAFFS) tomorrow (June 26)." In addition, the same report states during a briefing from the Teller County Sheriff's Office (TCSO) at 7:05 p.m. that there are "4 MAFFS on Eagle Lake Camp."[111] Eagle Lake Camp, a remote site owned and operated by a non-profit organization, is located west of its headquarters operation in Colorado Springs. The camp

---

[107] All Incident Action Plans (IAP) from the Waldo Canyon Fire are from the author's personal collection.

[108] National Incident Management Team, Great Basin Team 2, Rich Harvey, Incident Commander, *Waldo Canyon Fire Narrative Summary*. NOTE: This document is from the author's private collection.

[109] Houseman et al., *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service*, 6.

[110] Dan Elliott and Mead Gruver, "Waldo Canyon Fires 2012: Fatal Crash Grounds Key Part of Firefighting Fleet," *Huff Post Denver*, July 3, 2012, http://www.huffingtonpost.com/2012/07/02/waldo-canyon-fires-2012-f_n_1645060.html.

[111] City of Woodland Park, *Waldo Canyon Fire after Action Report* (Woodland Park, CO: City of Woodland Park, 2013), 10–11.

is wholly within the Pike National Forest and is located in the mountains some six miles west of the Colorado Springs city limits. IAPs from the Waldo Canyon Fire documents that USFS owned and contracted helicopters and air tankers were involved in fire suppression on June 25.[112] Military aircraft were engaged in the Waldo Canyon Fire within three days from the start of the fire.

The timeline from the Waldo Canyon Fire contrasts with the Hayman Fire, in which DOD aircraft did not arrive to the incident until six days after the fire started. Still, in a USFS review of the Waldo Canyon Fire, an area to be "enhanced" is the role and utilization of military assets. The report states,

> There was confusion by the public over the use and role of the military in assisting the incident. This can be enhanced by developing agreements between the agencies to define expectations and in sharing the terms of these agreements with the public.[113]

## C. BLACK FOREST FIRE—2013

The Black Forest Fire, located in El Paso County, Colorado just north of the city of Colorado Springs, started on June 11, 2013, at approximately 1 p.m. and was "100 percent contained" on June 20, 2013. The Black Forest Fire burned 14,280 acres, resulted in the evacuation of approximately 38,000 people, burned 489 homes and 196 detached garages/outbuildings, and resulted in the death of two residents.[114] Recreation areas, utilities infrastructure, and natural resources were destroyed, as occurred during the Hayman and Waldo Canyon Fires. The El Paso County Sheriff's Office (EPSO) *Black Forest Fire After Action Report/Improvement Plan* states, "The following shows an overall cost associated with the incident: aircraft 20 percent, equipment 29 percent, crews 15 percent, and fire support personnel were 23 percent. Total cost for the incident as of

---

[112] All Incident Action Plans (IAP) from the Waldo Canyon Fire are from the author's personal collection.

[113] "Waldo Canyon Fire Review," September 26, 2013, http://www.wildfirelessons.net/communities/community-home/librarydocuments/viewdocument?DocumentKey=da3e0589-a61e-4988-b849-c7a76a3ce6c3&tab=librarydocuments.

[114] El Paso County, *Black Forest Fire after Action Report/Improvement Plan* (Colorado Springs, CO: El Paso County, 2014), 5.

June 20, 2013 was $9,829,056."[115] The cost specifically for aircraft at the Black Forest Fire was $1,603,354.[116] The report also indicates that the total market value loss was $116,308,348.[117] No firefighter fatalities occurred as a result of the Black Forest Fire.

The Black Forest Fire was immediately adjacent to the city limits of Colorado SpringsCSFD resources were dispatched to a report of smoke and a possible wildland fire at virtually the same time that Black Forest Fire Rescue (BFFR), the authority having jurisdiction, was responding.

BFFR resources were quickly overwhelmed and assistance from multiple partner agencies was requested very early during the incident, including from the state of Colorado and the USFS. USFS (owned and/or contracted) helicopters and fixed wing air tankers were requested and responded. Eventually, helicopters, SEATs, heavy air tankers, and a DC-10 very large air tanker (VLAT) responded to the Black Forest Fire.[118]

In addition to mutual aid from local agencies, the DOD also quickly responded. Helicopters from the United States Army's (USA's) Fort Carson, located on the south side of Colorado Springs, were at the fire approximately six hours after the fire began.[119] USA helicopters were eventually supported by other DOD aircraft at the Black Forest Fire, including Colorado Army National Guard (COARNG) helicopters and MAFFS units from the United States Air Force (USAF) at PAFB. Both active duty units and reserve units flew military aircraft. The complete response included six helicopters from Army National Guard units in Colorado, Nebraska, and Wyoming; four helicopters from the USA's 4th Infantry Division (ID)/4th Combat Aviation Brigade (CAB); and two C-130s equipped with MAFFS from the USAF's 302nd AW. Helicopters from the 4th CAB performed 914 water bucket drops that totaled 689,970 gallons of water over 167.7 flight

---

[115] El Paso County, *Black Forest Fire after Action Report/Improvement Plan*, 46.

[116] Ibid., 27.

[117] Ibid., 5.

[118] Ibid.

[119] "Military Joins Wildfire Fight Must Faster than Last Year," June 12, 2013, http://denver.cbslocal.com/2013/06/12/military-joins-wildfire-fight-much-faster-than-last-year/.

hours. MAFFS equipped airplanes from the 302nd AW flew 12.1 hours and conducted 14 drops totaling 37,529 gallons of retardant.[120]

DOD aircraft responded to this incident with helicopters and fixed wing aircraft on the same afternoon that the fire began. As reported by CBS4 Denver, "Part of the federal response to the Black Forest Fire is the huge role the military has played in battling the fire" and "The Colorado Army National Guard helicopters have been launching from Buckley Air Force Base and heading down to the burn area on a daily basis. Military support has played a large role both in the air and on the ground"[121] The military's response was conducted via the IRA, which gives commanders at local DOD installations the authority to respond to civilian emergencies as long as it does not compromise their mission. "The Immediate Response Act brought military resources in to play much faster this time around than last year during the Waldo Canyon Fire. It allows for support like the C-130s from Peterson Air Force Base."[122]

The more aggressive response to the Waldo Canyon Fire is indicative of a shift in federal strategy regarding DOD aircraft being deployed more quickly to wildfires. In January 2013, prior to the start of the wildfire season, Federal Emergency Management Agency (FEMA) Administrator Craig Fugate met with USNORTHCOM's General Charles Jacoby to discuss a more rapid response of military assets to all types of civilian emergencies, including wildfires. Administrator Fugate's and General Jacoby's meeting occurred at USNORTHCOM's headquarters, prior to the start of the 2013 wildfire season. General Jacoby stated, "Making specially equipped C-130 cargo aircraft available sooner is under discussion as military and civilian officials get ready for the 2013 wildfire season."[123] Providing military aircraft sooner was under consideration because, "Under current rules, they can't be called up unless all the civilian and commercial firefighting

---

[120] El Paso County, *Black Forest Fire After Action Report/Improvement Plan* (Colorado Springs, CO: El Paso County, 2014), 68–70.

[121] "Military Plays Huge Role in Fighting Black Forest Fire," June 15, 2013, http://denver.cbslocal.com/2013/06/15/military-plays-huge-roll-in-fighting-black-forest-fire/.

[122] Ibid.

[123] "Military Considers Joining Fighting Wildfires Sooner," January 23, 2013, http://denver.cbslocal.com/2013/01/23/military-considers-joining-fighting-wildfires-sooner/.

aircraft are in use or unavailable. Last year's devastating wildfires across the West prompted some civilian officials to question why the C-130s weren't called in sooner."[124] The sentiment expressed is reminiscent of concerns expressed both by elected officials and citizens after both the Hayman Fire and the Waldo Canyon Fire.

The discussion between General Jacoby and Administrator Fugate was especially relevant to wildfires along the Front Range of Colorado generally, and in south central Colorado, specifically. The relevance of Administrator Fugate's and General Jacoby's discussion to Colorado is due to the MAFFS capabilities of the 302nd AW located at PAFB on the east side of Colorado Springs. In addition, the USA's Fort Carson, home to multiple helicopters with the ability to drop water from buckets, is located on the south side of Colorado Springs.

## D. CONCLUSION

These three case studies are representative of the problems with the way that military aircraft are deployed to civilian wildfires. At each of the three wildfires, military aircraft were utilized, but they arrived in very different time intervals. The time disparity is indicative of the miscommunication and confusion that occurs due to existing laws, current agency policies, and a misplaced concern for "non-competition" when lives, property, infrastructure, and natural resources are at risk. The current system can be improved by updating federal laws to reflect the historical evolution of wildfires, by evaluating when DOD aircraft are dispatched, and by encouraging local jurisdictions to be more proactive in developing formal relationships with neighboring military bases or installations.

[124] "Military Considers Joining Fighting Wildfires Sooner."

THIS PAGE INTENTIONALLY LEFT BLANK

# III. CURRENT SYSTEM

> Wildland fires emerged in full view of our aviation staff, who watched them grow as federal firefighters waited for other "approved" aircraft to be dispatched from distant locations. I encourage you to do your part by directing leadership within your respective agencies to rescind this unnecessary and artificial restriction as soon as possible.[125]
>
> Governor Steve Bullock, State of Montana
> August 21, 2015

Waiting for approved aircraft to arrive limits the effectiveness of DOD aircraft during civilian wildfire events. As noted by Governor Bullock, restrictions on the use of "approved" aircraft extend to the use of military aircraft during civilian wildfires. "Approved" aircraft are often more distant than military aircraft. Military aircraft, however, are prohibited from responding due to the Economy Act.[126] The prohibition to utilizing closer military aircraft results in frustration, greater damage to property and forested lands, and increased cost for suppression.

It should be noted that DOD aircraft are routinely used on land that is their responsibility. Wildfires are common on military lands where live ammunition and ordnance is utilized. The DOD recognizes the responsibility for wildfire on its own and adjacent lands with the following direction to its commanders: "For installations with burnable acreage or bordered by burnable acreage" to "Plan for and respond to wildland fires on installations."[127] The military is responsible for suppressing those fires. One of the resources available to attack wildfire on military installations is helicopters with buckets. The DOD commonly exercises this routine operation.

This chapter reviews the current situation regarding the use of military aircraft during civilian wildfires from the perspective of existing guidelines and doctrine (both

---

[125] "Governor Bullock to USDA: Cut Unnecessary Obstacles to Firefighting Efforts," August 21, 2015, https://governor.mt.gov/Newsroom/ArtMID/28487/ArticleID/1726.

[126] Money and Finance, 31 U.S.C. § 1535 (2003).

[127] Under Secretary of Defense (AT&L), *DOD Fire and Emergency Services Program* (DOD Instruction 6055.06) (Washington, DC: Under Secretary of Defense (AT&L), 2006), 21.

civilian and military), legislative requirements, resource sharing agreements, such as the EMAC, and other implications of current policy.

## A. NATIONAL INTERAGENCY FIRE CENTER

The NIFC is the civilian agency with primary responsibility for coordinating the response to wildfire in the United States. The agency's homepage states, "The National Interagency Fire Center (NIFC), located in Boise, Idaho, is the nation's support center for wildland firefighting."[128] Due to the regularity with which the DOD is called upon to assist with civilian wildfires, the NIFC has developed a *Military Use Handbook*.[129]

The *Military Use Handbook*, last updated in July 2006, is a comprehensive document with detailed information regarding the use of military assets, including aviation equipment. Relevant chapters in the handbook regarding the use of military aircraft include Chapter 10, General; Chapter 20, Resource Ordering Procedures for Military Assets; Chapter 70, Aviation; and Chapter 100, Incident Business Management. Each of these chapters provides direction to civilian management regarding the use of DOD aircraft. Supporting the premise of this thesis that the use of military aviation equipment for civilian wildfires can and should be streamlined, the first page of the *Military Use Handbook* in Section 10.2 (Overview) states, "Mobilization of military assets is a complicated, detailed, and time consuming process."[130] Further, on the same page in Section 10.3 (Ordering Requirements and Process), the reader is advised, "Before military assets can be mobilized, all civilian resources must be committed either to active fires or to initial attack."[131] These statements in a civilian manual caution the reader that ordering and using military resources is complex and cumbersome. Reinforcing this idea further, during an interview with a MAFFS pilot for this thesis, he suggested that

128 "NIFC Home," accessed September 7, 2015, https://www.nifc.gov/.

129 National Interagency Fire Center, *Military Use Handbook*.

130 Ibid., 1.

131 Ibid.

requesting DOD services is like calling an 800-pound gorilla and noted that they come with a lot of baggage and a complicated chain of command.[132]

*DOD Assets: Request/Approval Process for Military Assets*, a Microsoft PowerPoint© presentation, explains, "NIFC is responsible for providing national coordination and logistical support for Federal interagency fire control actions including DOD assets" and "NIFC is the liaison between Federal/State agencies and DOD for military assistance in suppressing wildfires."[133] The presentation identifies the ordering process when military assistance is requested. The following flowchart is applicable to all DOD assets, including aircraft for the suppression of civilian wildfire:

Incident
↓
Dispatch Center/Expanded Dispatch
↓
GACC (Geographic Area Coordination Center)
↓
NICC (National Incident Coordination Center)/Defense Coordinating Officer (DCO)
↓
NORTHCOM
↓
DOD Component Command
↓
Sending Military Installations[134]

For aircraft with MAFFS capabilities specifically, a FEMA DCO stated in a telephone conversation that USNORTHCOM notifies the 1st Air Force (Air Force North) who then coordinates with the Air Expeditionary Group (AEG) to identify which MAFFS team is on-call. The MAFFS units are on-call for a month at a time.[135] These basic plans are based on the existing process for the request and utilization of military resources, including airplanes and helicopters, for assistance in helping suppress civilian wildfires.

---

[132] MAFFS pilot, in discussion with the author, May 5, 2015.

[133] *DOD Assets: Request/Approval Process for Military Assets*, PowerPoint, n.d., slide 4.

[134] Ibid., 5.

[135] Mr. Steve O'Brien, FEMA Region 10 Defense Coordinating Element staff member, in discussion with the author, May 1, 2015.

The NIFC and the NWCG also maintain specific directions for ordering military aircraft in other documents. These directions can be found in the *National Interagency Mobilization Guide*,[136] often referred to simply as the "Mob Guide." The Mob Guide has a "Mobilization Procedures for Military Assets" section beginning on page 52.[137] This section has a bulleted list of steps to be taken when requesting military support. The first bullet states that when considering the long-term use of military resources, "NICC will determine if all available civilian resources have are committed."[138] Another limitation regarding military aircraft identified by the Mob Guide is that, "It should be noted that military Aviation resources, when compared to civilian resources, are restricted in mission capability."[139] Like the *Military Use Handbook*, the Mob Guide clearly identifies the current limitations to the use of DOD aircraft when responding to civilian wildfires.

Another manual that addresses ordering military aircraft is the *Interagency Aerial Supervision Guide*.[140] Chapter 5, Incident Aircraft, references both helicopter and aircraft operations. Regarding fixed wing air tankers, "The National Interagency Coordination Center (NICC) mobilizes Modular Airborne Firefighting Systems (MAFFS) as a reinforcement measure when suitable contract air tankers are not readily available within the contiguous 48 states." For helicopters, the guide says, "Regular military helicopter assets may be provided by the Department of Defense when civilian aviation resources are depleted." Consistently throughout all of the referenced civilian manuals, the information indicates that military aircraft are not used as an initial response tool and are not accessed by civilian authorities until there are no other options. As noted by Governor Bullock's comments, he believes the current system should be changed to remove barriers to accessing DOD aircraft. Other state and local officials may have the same belief.

---

136 National Interagency Fire Center, *National Interagency Mobilization Guide* (NFES 2092) (Boise, ID: National Interagency Fire Center, 2012).

137 Ibid., 52.

138 Ibid.

139 Ibid., 53.

140 National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide* (NFES 002544, PMS 505) (Boise, ID: National Interagency Fire Center, 2014.

## B. DEPARTMENT OF DEFENSE

The DOD has established a number of doctrines that are applicable to the use of their assets in a civilian setting. DOD doctrine includes direction for the DOD's own fire departments, support to law enforcement programs, assistance to civilian authorities, and incorporating the National Guard into civilian support.

### 1. Fire and Emergency Services Program

First, the DOD provides fire protection on its installations for the protection of the people and property that work there. DOD Instruction 6055.06, titled *DOD Fire and Emergency Services (F&ES) Program*, states that:

> It is DOD policy to:
>
> 4.3 Prevent and minimize loss of DOD lives and damage to property and the environment occurring in periods of peace, war, homeland security/defense, military operations other then war, and humanitarian operations.
>
> 4.4 When called upon and approved by appropriate authority, make DOD F&ES capabilities available to assist civil authorities under mutual aid agreement, host nation support agreements and Defense Support of Civil Authorities (DSCA).[141]

It is clear by this directive that the DOD has the capability and the understanding of the need for responding to civilian emergencies. The instruction continues also to identify the responsibilities of various DOD leadership positions. Section 5.5.14 directs that:

> The heads of the DOD Components maintaining organized F&ES programs shall: Implement procedures to ensure that an installation commander may provide aid to the local community under immediate response authorities (to save lives, prevent human suffering, and mitigate great property damage),[142]

Further, the next section of Instruction 6055.06 identifies the DOD's recognition of its capabilities for responding to civilian wildfires. Section 5.5.15 indicates:

---

[141] Under Secretary of Defense (AT&L), *DOD Fire and Emergency Services Program*, 2.

[142] Ibid., 5.

> Implement procedures to report all requests from the National Interagency Fire Center (NIFC), National Incident Coordination Center, and subordinate Geographic Area Coordination Centers for certified DOD civilian fire fighters to support Type I Incident Management Teams to the appropriate supported Combatant Commander.[143]

Instruction 6055.06 further continues to define three different means by which the installation commander can provide support to civilian authorities: are immediate response, mutual aid, and automatic aid. These different mechanisms help leadership make decisions regarding assistance within the civil-military interface. The description of immediate response is:

> For the purposes of this Instruction, immediate response is any form of immediate action taken by a DOD Component or military commander to assist civil authorities or the public to save lives, prevent human suffering, or mitigate great property damage under imminently serious conditions occurring where there has not been any declaration of major disaster or emergency by the President, or there is an attack.[144]

Mutual aid, then, is defined as, "Reciprocal assistance by emergency services under a prearranged agreement or plan,"[145] while automatic aid is, "A legally binding agreement for the automatic response by installation/base fire departments to prearranged areas outside the installation/base and, conversely, an automatic response by the outside municipality/government to prearranged areas inside the installation/base."[146]

Within its basic instruction regarding the provision of fire response, DOD Instruction 6055.06 (*DOD Fire and Emergency Services (F&ES) Program*), the military directs its personnel to be prepared to support the civilian community in times of need. Support to civilians for wildfire response is specifically included. Reference to the NIFC is also included in DOD Instruction 6055.06. It is clear by the instruction that local installation commanders have the responsibility and authority to act in support of civilian

---

[143] Under Secretary of Defense (AT&L), *DOD Fire and Emergency Services Program*, 5.

[144] Ibid., 17.

[145] Ibid., 18.

[146] Ibid., 15.

authorities. The same responsibility and authority is extended to those installations with aircraft and/or helicopters.

### 2. Defense Support of Civil Authorities and Immediate Response Authority

Next, the DOD has codified a directive regarding defense support to civil authorities, also known as DSCA, in Directive number 3025.18.[147] DOD Directive 3025.18 very thoroughly outlines the specific responsibilities regarding the provision of DSCA. DSCA is defined as:

> Support provided by U.S. Federal military forces, DOD civilians, DOD contract personnel, DOD Component assets, and National Guard Forces (when the Secretary of Defense, in coordination with the Governors of the affected States, elects and requests to use those forces in title 32, U.S.C., status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. Also known as civil support.[148]

The directive further specifies applicability to various DOD components, the requirements for the initiation and suspension of IRA, other relevant policies, and definitions for various terminologies.

The DOD has identified that DSCA is applicable to the Office of the Secretary of Defense (OSD) down through "All other organizational entities within the Department of Defense (hereafter referred to collectively as the 'DOD Components')."[149] The directive specifically identifies the Army National Guard and the Air National Guard when they are in Title 32 status. For the Army National Guard and the Air National Guard to be deployed via DSCA, the Secretary of Defense must request and receive permission from

---

[147] Under Secretary of Defense (P), *Defense Support of Civil Authorities (DSCA)*. DOD Directive 3025.18 (Washington, DC: Under Secretary of Defense (P)), 2012.

[148] Ibid., 16.

[149] Ibid., 1–2.

the governors of the impacted states. Specific policies regarding the use of the National Guard for DSCA are outlined in DOD Instruction 3025.22.[150]

In addition, as addressed in DOD Instruction 6055.06, the IRA is also addressed within this directive regarding DSCA. DOD components are expressly authorized to, "Have IMMEDIATE RESPONSE AUTHORITY as described in this Directive."[151] Specifically, the directive states:

> In response to a request for assistance from a civil authority, under imminently serious conditions and if time does not permit approval from higher authority, DOD officials may provide an immediate response by temporarily employing the resources under their control, subject to any supplemental direction provided by higher headquarters, to save lives, prevent human suffering, or mitigate great property damage within the United States. Immediate response authority does not permit actions that would subject civilians to the use of military power that is regulatory, prescriptive, proscriptive, or compulsory.[152]

The directive outlines when IRA must end and military resources should report back to their normal duty station and assignments. Generally, the directive compels immediate response to terminate when the emergency has passed; when enough private, local, or state resources can meet the needs of the situation; or when higher military authority directs the end of the response.[153] Further, IRA is required to end, "Not later than 72 hours after the request for assistance was received."[154] The 72-hour time limit may be extended upon approval by a higher authority only after formal review.[155] A military commander's ability to operate under IRA is very clearly specified. IRA is an avenue for civilian authorities to gain the assistance of military assets, specifically aircraft and helicopters, to respond to wildfires that are beyond the control of the civilian community to control. However, local governments should be prepared for military support to end,

---

[150] Under Secretary of Defense (P), *The Use of the National Guard for Defense Support of Civil Authorities* (DOD Instruction 3025.22) (Washington, DC: Under Secretary of Defense (P), 2013), 2.

[151] Under Secretary of Defense (P), *Defense Support of Civil Authorities (DSCA)*, 4.

[152] Ibid.

[153] Ibid., 5.

[154] Ibid.

[155] Norman M. Wade, *HDS1 Smartbook, Homeland Defense and DSCA: Protecting the Homeland/Defense Support to Civil Authority* (Lakeland, FL: The Lightning Press, 2015), 4–22.

"When there are enough private, local, or state resources to meet the needs of the situation."[156] Those resources may not be readily available to the local jurisdiction, but DOD assets will likely return to their installation.

Included in DOD Directive 3025.18 are two specific policies that impact the response of military aircraft to civilian emergencies, (1) approval for DSCA, and (2) reimbursement. First, when IRA is either not possible or beyond the scope of the emergency, DSCA can be implemented upon request of an appropriate civilian authority, such as a governor. The following guidelines are evaluated prior to DSCA approval being granted, and subsequently, to receive payment for services.

### *a. DSCA Approval*

Prior to DSCA implementation, the following items must be assessed:

- Legality (compliance with laws)
- Lethality (potential use of lethal force by or against DOD Forces)
- Risk (safety of DOD Forces)
- Cost (including the source of funding and the effect on the DOD budget)
- Appropriateness (whether providing the requested support is in the interest of the Department)
- Readiness (impact on the DOD's ability to perform its other primary missions)[157]

Within the context of the deployment of military aircraft to civilian wildfires, all six items listed above for military evaluation are applicable. Some may question whether "lethality" is relevant to the DOD response to wildfires. For wildfires, it is obviously not a concern that DOD personnel or equipment would use lethal force. The concern, then, is that U.S. citizens may attempt to use force against DOD aircraft. For example, this scenario must be considered when responding to wildfires in areas where sovereign citizens reside or where illegal drug operations are being protected, among others.

---

[156] Under Secretary of Defense (P), *Defense Support of Civil Authorities (DSCA)*, 5.

[157] Ibid., 4.

From an operational standpoint, when military resources are approved for a DSCA mission, they deploy with six operational phases:

- Phase 0 (Shape)—continuous situational awareness and preparedness
- Phase 1 (Anticipate)—identification of a potential mission, a no-notice event, or when directed by the President of the United States or the Secretary of Defense
- Phase 2 (Respond)—deployment of initial response capabilities
- Phase 3 (Operate)—DSCA operations commence
- Phase 4 (Stabilize)—military and civil authorities decide that DOD support will scale down
- Phase 5 (Transition)—redeployment of DOD forces to their respective commands[158]

It should be noted that DSCA mission success is defined to have occurred, "When DOD forces have transitioned all operations back to civil authorities."[159]

### *b. Reimbursement*

Reimbursement, and especially the notion that military assets will not "compete" with resources from other federal agencies and/or contracted equipment, results in the most significant barrier to deploying military aircraft to civilian wildfires. Cost reimbursement is an important element regarding DSCA for the response of military aircraft to civilian wildfires. 3025.18 (4) (d) states, among other specifics, "All requests for DSCA shall be written, and shall include a commitment to reimburse the Department of Defense in accordance with sections 5121, et seq, of Reference (f) (also known as 'The Stafford Act'), section 1535 of title 31, U.S.C. (also known as 'The Economy Act')."[160]

Cost recovery is also applicable to and required of National Guard Bureau (NGB) assets when they are providing DSCA. *The Use of the National Guard for Defense*

---

[158] Wade, *HDS1 Smartbook, Homeland Defense and DSCA: Protecting the Homeland/Defense Support to Civil Authority*, 2–29.

[159] Ibid.

[160] Under Secretary of Defense (P), *Defense Support of Civil Authorities (DSCA)*, 3.

*Support of Civil Authorities*, DOD Instruction 3025.22 (3) (f) (2) specifically states that the National Guard will not be approved for a DSCA mission "Unless the Secretary of Defense has approved a reimbursable request for DOD assistance from that federal department or agency."[161] The use of the National Guard is explored further in a later section of this chapter.

The DOD, in partnership with the DOI and the USDA, has also signed the *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*. This agreement, first established in June 1975, outlines the use of military assets during civilian wildfires through its purpose statement. The purpose statement reads:

> The purpose of this Interagency Agreement is to establish the general guidelines, terms and conditions under which NIFC will request and DOD will provide temporary support to NIFC in wildland fire emergencies occurring within any State, U.S. Territory or Possession, or the District of Columbia, including fires on State and private lands.[162]

As noted previously, reimbursement of costs to use DOD assets is an essential requirement for the response of military aircraft to civilian wildfires. As such, the purpose statement concludes with:

> It is also intended to provide the basis for reimbursement of DOD expenditures under the Economy Act (31 U.S.C §§ 1535–36) for goods and services provided through the NIFC to the various firefighting agencies for response to wildland fire emergencies.[163]

Within the "Terms of Agreement," item C. states, "This Agreement, does not supersede or modify existing mutual aid agreements, assistance agreements, Memoranda of Understanding, or other contract procedures between individual DOD installations and local communities."[164] The agreement recognizes the importance of local mutual aid and

---

[161] Under Secretary of Defense (P), *The Use of the National Guard for Defense Support of Civil Authorities*, 3.

[162] United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense, *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*, 1.

[163] Ibid.

[164] Ibid., 5.

automatic aid agreements referenced earlier in this chapter. Local agreements will be reviewed in a later section.

Up until 2006, the interagency agreement between the DOD, DOI, and USDA, specified in the "Responsibilities" section that NIFC would, "Ensure that all available or suitable civilian resources have been committed, and the requested support is not in competition with private enterprise."[165] That very specific language was replaced with the following, "Ensure that request for utilization of DOD aviation or other assets will be reviewed and compliant with the Economy Act of June 30, 1932, as amended (31 U.S.C. §§ 1535, 1536), the Federal Acquisition Regulations (FAR), and any other applicable laws and regulations, as appropriate."[166] The current version of the interagency agreement, signed in 2010, and in effect through the end of 2015, also incorporates this language.[167]

Although it may appear that the newer wording is more conducive to the acquisition of DOD assets for fighting civilian wildfires, one MAFFS pilot has opined that the Economy Act's guidance is too vague and results in confusion regarding how to define that the requirements have been met.[168]

## C. LEGAL CONSIDERATIONS

In addition to the doctrine established in both the civilian wildfire community and the DOD, multiple legal considerations impact the use of military aircraft at civilian wildfires. Relevant federal laws include the Economy Act, the Stafford Act, the Insurrection Act, and Posse Comitatus. The laws that appear to have had the most impact on the use of DOD aircraft in a civilian environment are the Economy and Stafford Acts.

---

[165] United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense, *Modification No. 01: Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations* (DOI Agreement No. 1422RAI050018, USDA Agreement No. 05-IA-11130206-053) (Washington, DC: Department of Defense, 2010), 1.

[166] Ibid.

[167] United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense, *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*, 2–3.

[168] MAFFS pilot, in discussion with the author, May 5, 2015.

### 1. The Economy Act

The Economy Act, established in 1932 before the use of aircraft, was contemplated for the suppression of wildfire, directs that:

> The head of an agency or major organizational unit within an agency may place an order with a major organizational unit within the same agency or another agency for goods or services if (1) amounts are available; (2) the head of the ordering agency or unit decides the order is in the best interest of the United States Government; (3) the agency or unit to fill the order is able to provide or get by contract the ordered goods or services; and (4) the head of the agency decides ordered goods or services cannot be provided by contract as conveniently or cheaply by a commercial enterprise.[169]

The MAFFS pilot's point about the baggage-laden 800-pound gorilla is well-taken in light of the language of this federal law. It can be construed as vague and potentially confusing for decision makers, both civilian and military, who are trying to comply with the law while providing for the safety of citizens and the preservation of natural resources. Specifically, item number 4 listed in the previous quote is the restriction usually referenced when discussing the restriction of military aircraft's response to civilian wildfire. The statement is identified as a "non-compete" restriction such that the federal government does not want to be viewed as competing with or taking business away from private industry. In his book regarding DSCA, Norman Wade explicitly states, "The Economy Act is also the basis for the general rule that DOD will not compete with commercial businesses."[170]

The Economy Act is referenced in multiple documents related to the deployment of military aircraft to civilian wildfires. Examples of documents in which the Economy Act is referenced include the NIFC's *Interagency Standards for Fire and Fire Aviation Operations*, the DOD's Directive 3025.18 (DSCA), and the DOD's interagency agreement with the DOI and the USDA. These references and others like them serve as a

---

[169] Money and Finance, 31 U.S.C. § 1535 (2003).

[170] Wade, *HDS1 Smartbook, Homeland Defense and DSCA: Protecting the Homeland/Defense Support to Civil Authority*, 7–1.

constant reminder to both civilian and military leadership of the tenuous relationship that exists regarding the use of military aircraft for civilian wildfires.

### 2. The Stafford Act

Congress adopted the Robert T. Stafford Disaster Relief and Emergency Assistance Act, simply known as "the Stafford Act," in 1988,[171] which was preceded by the Disaster Relief Act of 1974.[172] When the President authorizes emergency, major disaster, or fire management declarations, the Stafford Act, "Enable federal agencies to provide assistance to state and local governments overwhelmed by catastrophes."[173] FEMA administers the activities of the Stafford Act.

The emphasis of the Stafford Act relative to wildfires is on mitigation and recovery efforts. The primary purpose of the Stafford Act is to return a community to "normal" after an emergency or major disaster, including wildfires.[174] However, the act also references emergency response activities to wildfires. According to a CRS report by McCarthy, "The statute also authorizes the President to provide fire suppression assistance to prevent a forest or grassland fire from becoming a major disaster."[175] Specifically regarding "Fire Management Assistance," the Stafford Act states:

> The President is authorized to provide assistance, including grants, equipment, supplies, and personnel, to any State or local government for the mitigation, management, and control of any fire on public or private forest land or grassland that threatens such destruction as would constitute a major disaster.[176]

The Act also provides for the utilization of DOD assets. Section 403 states that governors may request that the President authorize the Secretary of Defense to, "Utilize the

---

171 The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

172 *Disaster Relief Act of 1974*, Pub. L. No. 93–288, 88 Stat. 143 et seq (1974).

173 McCarthy, *Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding*, 1.

174 The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

175 Ibid., 2.

176 Federal Emergency Management Agency (592), *Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities* (Washington, DC: Federal Emergency Management Agency, 2007), 48.

resources of the Department of Defense for the purpose of performing on public and private lands any emergency work which is made necessary by such incident and which is essential for the preservation of life and property."[177]

Like the Economy Act, the Stafford Act addresses reimbursement for the use of federal resources. Regarding federal assistance, the Stafford Act permits the President to, "Direct any Federal agency, with or without reimbursement to save lives, protect property and public health and safety, and lessen or avert the threat of a catastrophe "[178] While the DOD is not specifically mentioned in this section of the Stafford Act (Section 502), it is presumed that the intent is to include DOD resources within the Stafford Act's guidance.

Similar to reimbursement, the Stafford Act addresses the use of contracted resources. The USG generally does not wish to compete with or limit private business. Regarding the opportunity for private business to be involved in response to emergencies or major disasters, the Stafford Act states, "Activities which may be carried out by contract or agreement with private organizations, firms, or individuals, preferences shall be given to those organizations, firms, and individuals"[179] In addition, the Homeland Security Act of 2002 reinforces the principle that regulates competition with the private sector. Congress directs the Secretary of the DHS to "Further the policy of the United States to avoid competing commercially with the private sector" and "rely on commercial sources to supply the goods and services."[180]

The Stafford Act and the Homeland Security Act, like the Economy Act, include limitations that impact the availability of military aircraft to be utilized on civilian wildfires. Further, regarding the use of DOD resources, the Stafford Act states, "Such emergency work may only be carried out for a period not to exceed 10 days."[181] It is not

---

[177] Federal Emergency Management Agency (592), *Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities*, 28.

[178] Ibid., 52.

[179] Ibid., 13.

[180] Ibid., 112. This reference is from the *Homeland Security Act of 2002*, Pub. L. No. 109–295 (2007).

[181] Ibid.

uncommon for uncontrolled wildfires to burn for extended periods of time far exceeding 10 days.

The Stafford Act and the Homeland Security Act invoke policy that results in preference for the use of contracted resources. The language in the Stafford Act and the Homeland Security Act may contribute to existing confusion regarding the reluctance to commit military aircraft to civilian wildfire suppression.

Probably due to the potential for confusion and delay when requesting military assets during civilian wildfires, a review of the Economy Act was directed in November 2003. In addition to the review of the Economy Act, the Stafford Act was also included in the 2003 directive. Titled *Review and Enhancement of Existing Authorities for Using Air Force and Air National Guard Modular Airborne Fire-Fighting Systems and Other Department of Defense Assets to Fight Wildfires*, the Director of the OMB was ordered to research the efficiency and effectiveness of deploying military assets to wildfires.[182] Specifically, the directive stated, "To ensure that, in accordance with applicable legal requirements, such assets are available in the most expeditious manner to fight wildfires on Federal lands or non-Federal lands at the request of a Federal agency or State government."[183] Further, the amendment asked the Director to study "Any adverse impact caused by the restrictions contained in section 1535(a) (4) of title 31, United States Code, or caused by the interpretation of such restrictions, on the ability of the Forest Service and other Federal agencies to procure such firefighting services," as well as whether DOD assets are being used "To fight wildfires in the most expeditious and efficacious way to minimize the risk to public safety."[184] The review was to be completed within 120 days.[185] The OMB released its report on May 17, 2004.

The OMB's report, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, in the executive summary states, "Agency guidance

---

[182] *Review and Enhancement of Existing Authorities for Using Air Force and Air National Guard Modular Airborne Fire-Fighting Systems and Other Department of Defense Assets to Fight Wildfires*, Pub. L. No. 108–136, 117 Stat. 1619, Div. A, Title X, § 1058 (2003).

[183] Ibid.

[184] Ibid.

[185] Ibid.

appears to have been the source of miscommunication between agency staff and external parties" and "This may have led to some confusion within the agencies."[186] The final paragraph of the executive summary concludes:

> Based on these and other factors, the OMB Director has determined that no changes in the Economy Act or the Stafford Act are necessary to ensure that military resources are made available and are used, as necessary and appropriate, for wildland firefighting, and that existing authorities are being used in a manner consistent with the available capabilities of Department of Defense assets to fight wildfires in the most expeditious and efficacious way to minimize the risk to public safety. While no changes to existing statutory authorities are necessary, certain administrative procedures relied upon by the wildland firefighting agencies should be clarified to ensure efficiency and effectiveness is not inadvertently compromised.[187]

The OMB completed its report in 2004; however, not much has changed in the practical application of DOD aircraft assigned to civilian wildfires.

Recommendations from the OMB report do not appear to have been widely adopted. The OMB recommended four "agency actions." One specific recommendation from the report involves transferring ownership of the MAFFS technology from the USFS to the governor in the states in which they are stationed. The report's language is, "USDA, DOI, and DOD will explore the possibility of transferring or assigning, under existing authorities, title of the MAFFS tanks and distribution systems to the relevant States."[188] The states are California, Colorado, North Carolina, and Wyoming. The transfer of MAFFS equipment, however, has not occurred, as the MAFFS units are still owned by the USFS.

A second recommendation from the OMB report that does not seem to have been completed is to clarify the language of the *National Mobilization Guide*, the *Military Use Handbook*, and the *MAFFS Operations Guide*, "To improve transparency and prevent

---

[186] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 1.

[187] Ibid.

[188] Ibid., 14.

any possible miscommunication."[189] The current wording in the documents, as previously noted, appears to discourage the use of military aircraft rather than encourage the use of military aircraft.

Another action step from the OMB report that might help the current situation is to "Enhance training of select Federal, military, National Guard, and State personnel on the requirements, appropriate interpretation, and implementation of the Economy Act."[190] More than 10 years after this report was completed, Montana Governor Bullock is still frustrated by the current situation, and personal communication from a MAFFS pilot indicates that the situation could be improved. Work still needs to be completed regarding these recommendations from the 2004 OMB report.

### 3. The Insurrection Act

The Insurrection Act was established in 1807 and has as its base the Militia Act of 1792. The intent of the original law was to suppress revolution. The law states:

> In all cases of insurrection, or obstruction to the laws, either of the United States, or of any individual state or territory, where it is lawful for the President of the United States to call forth the militia for the purpose of suppressing such insurrection, or of causing the laws to be duly executed, it shall be lawful for him to employ, for the same purposes, such part of the land or naval force of the United States.[191]

The Insurrection Act's primary purpose is to permit the President to enforce U.S. law through the military.[192] The law does not specify the use of military forces for missions other than law enforcement. However, for a brief period of time after Hurricane Katrina in 2006, Congress amended the scope of the law specifically to include response of federal forces to natural disasters.

The Insurrection Act was amended in 2006 by adding situations under which the President could dispatch the military in support of a state or states. The law previously

---

[189] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 14.

[190] Ibid.

[191] Insurrection Act, 10 U.S.C. §§ 331–335 (1807).

[192] Ibid.

included the following emergencies: "insurrection, domestic violence, unlawful combination, or conspiracy."[193] As amended, the Insurrection Act added "natural disasters, epidemics, or other serious public health emergencies, terrorist attacks or incidents, or other conditions."[194] Although not specifically defined in the amendment, it is possible that natural disasters could be defined to include wildfires.

The amendment's intent was to restore law and order after a natural disaster, not to provide response capabilities to mitigate the effects of the disaster. The amendment to the law was repealed after only two years, and in 2008, the original language of the Insurrection Act was restored without the amendment ever having been implemented. The question, then, is could the Insurrection Act as amended have been used to improve the response of military aircraft to civilian wildfires? It is not likely that the Presidential powers of the Insurrection Act would be invoked to deploy aircraft to suppress a civilian wildfire. However, invoking the Insurrection Act should be considered if it could improve the response of DOD aircraft to civilian wildfires.

#### 4. Posse Comitatus

Another legal consideration when deliberating the civil-military interface for the use of DOD aircraft for civilian wildfires is the Posse Comitatus Act. Posse Comitatus generally works concurrently with the Insurrection Act and is another legal principle concerned with the use of military personnel enforcing the laws of the land. Specifically, the Posse Comitatus Act states:

> Whoever, except in cases and under circumstances expressly authorized by the Constitution or Acts of Congress, willfully uses any part of the Army or the Air Force as a posse comitatus or otherwise to execute the laws shall be fined under this title or imprisoned not more than two years, or both.[195]

---

[193] Danielle Crockett, "The Insurrection Act and Executive Power to Respond with Force to Natural Disasters" (paper prepared for Law 224.9, Disasters and the Law, University of California Berkeley School of Law, Spring 2007).

[194] Ibid.

[195] Posse Comitatus Act, 18 U.S.C. §1385 (1878).

Elsea writes in a CRS report that the Posse Comitatus Act, "reflects an American tradition that bridles at military involvement in civilian affairs."[196] Elsea further states that the act, "rebels against military involvement in civilian affairs."[197] It follows, then, that the use of military personnel and equipment used to fight civilian wildfires might be called into question. However, "While inquiries may surface in other contexts, such as the use of the armed forces to fight forest fires or to provide assistance in the case of other natural disasters, Posse Comitatus Act questions arise most often when the armed forces assist civilian police."[198] Given this interpretation, along with the exclusion of the National Guard from the Posse Comitatus Act when operating as a Title 32 state asset,[199] the use of military aircraft for suppressing wildfire should not be construed as violating the intent of the act. Similar to consideration of the Insurrection Act, can the Posse Comitatus Act be utilized to support or encourage the use of military aircraft during civilian aircraft? It is unlikely that the Posse Comitatus Act would be a barrier for the deploying military aircraft to civilian wildfires; however, clarifying this fact may improve the responsiveness of deploying DOD equipment to civilian emergencies.

## D. RESOURCE SHARING AGREEMENTS

"Large-scale wildfires do not respect jurisdictional boundaries. Wildfires, like most disasters, require the collaboration of multiple agencies and organizations"[200] A number of agreements can be utilized for collaborating to share resources, including aircraft, during emergencies. Generally speaking, ""intergovernmental agreement" is a broad term that refers to any agreement that involves or is made between two or more governments to cooperate in some specific way."[201] Examples of intergovernmental

196 Elsea, *The Posse Comitatus Act and Related Matters: A Sketch*, Summary.

197 Ibid., 1.

198 Ibid., 3.

199 Eric V. Larson and John E. Peters, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options* (Santa Monica, CA: RAND Corporation, 2001), 244.

200 Casey J. Fleming, Emily B. McCarta, and Toddi A. Steelman, "Conflict and Collaboration in Wildfire Management: The Role of Mission Alignment," *Public Administration Review* 73, no. 3 (May/June, 2015): 445.

201 "Intergovernmental Agreement Defined," accessed September 16, 2015, http://www.ehow.com/facts_5813047_intergovernmental-agreement-defined.html.

agreements include MOU, mutual aid agreements, and automatic aid agreements. Although similar in name and purpose, each of these examples attempts to reach the same end although via different means. Resource sharing agreements have great versatility, assuming the parties can reach a consensus on terms. These agreements are also flexible from the standpoint of with whom they are enacted. Agreements may be entered into between all types of governmental entities, including between local governments, between local and state governments, between local governments and federal entities, and so on. This section specifically reviews two existing resource sharing agreements. The first is the EMAC (a state-to-state resource sharing agreement) and the second is the PPMJRSP (a document guiding the resource sharing relationship between two municipal governments, one county government, one USA post, and two USAF bases).

Relative to the use of DOD aircraft during wildfires, all these various arrangements may be utilized by civilian authorities to create partnerships with their local, neighboring military installations. However, these agreements do not replace existing DOD protocol, such as the IRA or DSCA processes.

Intergovernmental agreements for resource sharing have a variety of names, such as mutual aid agreements, automatic aid agreements, and memoranda of understanding. The first type is a mutual aid agreement. A mutual aid agreement is defined as:

> A written agreement between agencies, organizations, or jurisdictions to lend assistance across jurisdictional boundaries. It agrees to assist by furnishing personnel, equipment, and expertise in a specified manner at a requisite time. Prior to the seeking of mutual aid agreement, an agency must first commit its own resources.[202]

An automatic aid agreement is a "Contractual agreement between two agencies, communities or fire districts to assist with the nearest available resource to the incident by disregarding the jurisdictional boundaries."[203] Last, a MOU is "A contract used to set forth the basic principles and guidelines under which the parties will work together to

---

[202] "Definitions: Mutual Aid Agreement Law & Legal Definition," accessed September 16, 2015, http://definitions.uslegal.com/m/mutual-aid-agreement/.

[203] "Definitions: Automatic Aid Law & Legal Definition," accessed September 16, 2015, http://definitions.uslegal.com/a/automatic-aid/.

accomplish their goals."[204] All three of these legal documents may be used for sharing resources during emergencies. Two examples of intergovernmental agreements that may be applicable to accessing DOD resources are the EMAC and the PPMJRSP.

"The EMAC is a congressionally ratified interstate mutual aid compact that provides a legal structure by which states affected by a catastrophe may request emergency assistance from other states."[205] Congressionally ratified as Pub. L. No. 104–321 in 1996, the EMAC is a mutual aid agreement implemented when a state's resources are overwhelmed and requests help from another state or states. According to Bruce Lindsay of the CRS, "EMAC is intended to facilitate fast deployment of specialized response units, such as hazardous materials teams, across state lines."[206] The compact has been signed by all 50 states, the District of Columbia, the U.S. Virgin Islands, Puerto Rico, and Guam. The National Emergency Management Association (NEMA) administers the EMAC.[207]

Lindsay further argues, "EMAC is arguably one of the more important instruments for intergovernmental aid."[208] The importance of the EMAC is that the legislation provides legal guidance and protections for all of the signatories prior to the need for the compact to be implemented. In addition, by signing the EMAC, all states acknowledges their obligations for such things as worker's compensation due to injury or death, reimbursement expectations, recognition of licensure and certifications held by responding personnel, liability, the states' responsibilities upon becoming a member of the EMAC, and other guidelines.[209] Deployment of needed resources can be accomplished efficiently and effectively because the signatories have agreed to these and other issues prior to the emergency or disaster.

---

[204] "Definitions: Memoranda of Understanding Law & Legal Definition," accessed September 16, 2015, http://definitions.uslegal.com/m/memorandum-of-understanding/.

[205] Lindsay, *The Emergency Management Assistance Compact (EMAC): An Overview*, 1.

[206] Ibid., 6.

[207] "What is EMAC?" accessed September 16, 2015, http://www.emacweb.org/index.php/learn aboutemac/what-is-emac.

[208] Lindsay, *The Emergency Management Assistance Compact (EMAC): An Overview*, 6.

[209] "EMAC Legislation," accessed September 16, 2015, http://www.emacweb.org/index.php/learn aboutemac/emac-legislation.

One specific area of agreement established by the EMAC is the deployment of NGB resources. NEMA reports that it was the intent of Congress to include access to and encourage the deployment of the NGB via the agreement. NGB resources include aircraft equipped with MAFFS. A GAO report indicates that the EMAC has been activated with greater frequency since its inception after including response to wildfires.[210] Although not specifically stated in the report, it can be construed that these responses to wildfires may include the deployment of MAFFS equipped military aircraft, as three of the four locations where MAFFS equipment are staged are NGB bases. Further, the agreement's purpose for the NGB is to work in a humanitarian function when crossing state lines while expressly prohibiting military actions as per the Posse Comitatus Act.[211]

The EMAC is one example of an intergovernmental agreement, in this case for state-to state resource sharing, that provides for the use of military personnel and equipment, specifically the NGB. The development of this type of agreement may have applicability to other levels of government desiring more direct accessibility to DOD aircraft for response to civilian wildfires. The EMAC website provides model legislation that can be amended (as needed) and adopted by various governmental entities for resource sharing.[212]

A second example of an intergovernmental agreement is the PPMJRSP. No longer in effect, the PPMJRSP was enacted by two municipalities, one county, and three (of the five) military installations in the greater Colorado Springs, Colorado region. The emphasis of the PPMJRSP was to, "Provide an orderly procedure to coordinate disaster

---

[210] Sharon L. Pickup, *Emergency Management Assistance Compact: Enhancing EMAC's Collaborative and Administrative Capacity Should Improve National Disaster Response* (GAO-07-854) (Washington, DC: U.S. Government Accountability Office, 2007), 10.

[211] "National Guard," accessed September 16, 2015, http://www.emacweb.org/index.php/national-guard.

[212] "Model Intrastate Mutual Aid Legislation," accessed September 16, 2015, http://www.emac web.org/index.php/mutualaidresources/intrastate-mutual-aid/modellegislation#Intra-Implement.

management and share civil-military resources and information."[213] The PPMJRSP contemplates the use of the DOD's IRA within the framework of the agreement. Further, the agreement specifically considers the use of fixed and rotor wing aircraft during civilian wildfires.

Whether through this agreement or within the context of the IRA, the PPMJRSP addresses one of the concerns regarding the current system for allocating DOD assets-including aircraft-for response to wildfire. The PPMJRSP states:

> Army and Air Force policy is that leases of military equipment will not be made for which a counterpart exists on the commercial market. The loan, lease, or use of military equipment is prohibited where the use of military equipment would deny the employment of civilians in their regular profession.[214]

As noted throughout this document, the statement outlined above and in other federal doctrine has the potential to stand in the way of rapid deployment of military air assets to civilian wildfires. The DOD's posture, a holdover from the Economy Act of 1932 noted previously, is a barrier to the efficient use of military resources when lives and property are at stake. Despite this limitation, the PPMJRSP is a representative example of the type of resource sharing agreement that can be established between civilian governments and neighboring military installations.

## E. NATIONAL RESPONSE FRAMEWORK

It might also be argued that the primary document regarding the coordinated response to large-scale emergencies or disasters in the United States is the NRF. The NRF was most recently updated in 2013.[215] In its current iteration, the NRF emphasizes a "whole community" approach, which includes direction to "individuals, families, and

---

[213] El Paso County Office of Emergency Management, City of Colorado Springs Office of Emergency Management, City of Fountain Police and Fire Departments, Ft Carson Directorate of Plans, Training and Mobilization, Peterson Air Force Base 21 CES/CEX, and the U.S. Air Force Academy 10 ABW/CE, *Pikes Peak Multi Jurisdictional Disaster Management Coordination and Resource Sharing Plan* (Colorado Springs, CO: El Paso County, City of Colorado Springs, City of Fountain, Fort Carson, Peterson Air Force Base, U.S. Air Force Academy, 1996), Promulgation.

[214] Ibid., 5.

[215] United States Department of Homeland Security, *National Response Framework*, iii.

households; communities; non-governmental organizations; private sector entities; local governments; state, tribal, territorial, and insular area governments; and the federal government."[216] Given the broadly intended audience, the NRF may be considered the nation's intergovernmental agreement.

The NRF states, "The NRF describes structures for implementing nationwide response policy and operational coordination for all types of domestic incidents."[217] Wildfires are a domestic incident. It is stated within the NRF, "Natural hazards-including hurricanes, earthquakes, wildfires, and floods-present a significant and varied risk across the country."[218] Natural and other hazards require that the nation be prepared to respond to disasters and emergencies.

The NRF's Guiding Principles say, "The priorities of response are to save lives, protect property and the environment, stabilize the incident and provide for basic human needs."[219] The DHS's direction is similar to the mission of many organizations outlined throughout this thesis, including the DOD and its IRA. Interestingly, although the "federal government" is one of the many organizations and is identified as part of the NRF's "whole community," the DOD and civil-military interface receives only a passing mention. The NGB is simply referenced as a state asset that can be called upon to assist with "Natural and manmade incidents" and "To support state domestic civil support functions and activities."[220] A footnote references the fact that the NGB can be "federalized" under U.S.C. Title 10 by the President and placed under the control of the DOD.[221]

The NRF also states that the President leads the response effort "To ensure that the necessary resources are applied quickly and efficiently"[222] Regarding the DOD

---

[216] United States Department of Homeland Security, *National Response Framework*, iii.

[217] Ibid., 4.

[218] Ibid., 7.

[219] Ibid., 5.

[220] Ibid., 14.

[221] Ibid.

[222] Ibid., 15.

specifically, the NRF's reference is to the President's role or the Secretary of Defense's role in authorizing the use of military assets unless the IRA is utilized.[223] Very few other references to the DOD appear in the NRF.

The NRF states, "Effective response requires a readiness to act" and "National response depends on the ability to act decisively. A forward-leaning posture is imperative for incidents that may expand rapidly in size, scope, or complexity, as well as incidents that occur without warning."[224] The success of the NRF will necessarily be limited without a greater recognition of the potential contribution from the DOD. As written, no "forward-leaning posture" by the DOD exists via the NRF. However, the NRF in its Executive Summary emphasizes in bold text, "This Framework is always in effect, and elements can be implemented at any time."[225] Finally, consistent with other federal doctrine, the NRF indicates, "Federal departments and agencies may execute interagency or intra-agency reimbursable agreements in accordance with the Economy Act or other applicable authorities."[226]

## F. CONCLUSION

This chapter has established that while existing systems for civilian governments are available to request military aircraft for suppressing wildfires, the current process is cumbersome and confusing. The burden of the existing system puts civilians' and firefighters' lives at risk and potentially adds to the destruction of personal property, the natural resource, and public infrastructure. While the use of aircraft is not the only tool needed to suppress wildfires, it is an option that must be made more readily available to civilian communities at risk from wildfires.

NIFC, the DOD, existing laws, and the NRF all impact the response of military aircraft to civilian wildfires. The NIFC has processes in place for the utilization of military aircraft to assist in the suppression of civilian wildfires. These processes include

---

[223] United States Department of Homeland Security, *National Response Framework*, 19.

[224] Ibid., 6.

[225] Ibid., i.

[226] Ibid., 29.

written procedures, a DOD liaison to the NIFC, and an established process for the civilian wildfire community to request DOD support. The DOD, then, also has established procedures for interfacing with the civilian community during wildfires, recognizing its role in response to civilian emergencies with its responsibilities from the DSCA and the IRA. Current laws, such as the Economy Act,[227] the Stafford Act,[228] the Insurrection Act,[229] and the Posse Comitatus Act,[230] limit the ability of the DOD to work with other federal agencies and civilian leaders. Finally, the NRF[231] outlines nation-wide response to emergencies and disasters. However, it does not substantially reference the DOD, thereby limiting the capability of other federal agencies and lower levels of government to respond to wildfires more efficiently.

Military aircraft can be dispatched to civilian wildfires. The patchwork of rules and regulations, however, make the existing system for dispatching military aircraft inefficient. The current rules and regulations can be improved to work together more sensibly, which results in military aircraft being dispatched to wildfires sooner, a safer response to wildfires, and less property destruction.

[227] Money and Finance, 31 U.S.C. § 1535 (2003).

[228] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

[229] Insurrection Act, 10 U.S.C. §§ 331–335 (1807).

[230] Posse Comitatus Act, 18 U.S.C. §1385 (1878).

[231] United States Department of Homeland Security, *National Response Framework*.

THIS PAGE INTENTIONALLY LEFT BLANK

# IV. OPTIONS FOR THE CURRENT SYSTEM

A system is in place that allows the USFS, state, and local governments to request, dispatch, and deploy military aircraft to civilian wildfires. However, this system must be updated to improve the efficiency of accessing these aircraft. This chapter suggests options to the current system of utilizing aircraft for wildfire suppression. One option is simply to maintain the existing system without modification. Another choice is to eliminate the use of DOD aircraft for response to civilian wildfires. In addition, this chapter suggests three options to improve the current system of utilizing DOD aircraft for wildfire suppression: (1) implement the IRA to utilize military aircraft at the same time as all other aircraft to civilian wildfires, (2) modify laws that establish barriers, or the perception of barriers, to the use of DOD aircraft, and (3) encourage the establishment of more resource sharing agreements between local jurisdictions and their neighboring military installations.

It must be understood that the response of DOD aircraft to civilian wildfires is not a solution to the civilian wildfire problem in its entirety. Aircraft dropping water or fire retardant do not fully suppress wildfires; it only slows the progress of the wildfire. As noted by a RAND study regarding the efficacy of large airtankers, "On-the-ground firefighters are therefore necessary to secure the fire line created by aviation assets."[232] Water or fire retardant dropped from aircraft generally only creates conditions in which ground resources may be more successful in fully suppressing any remaining fire. It cannot be stated enough that the use of aircraft for fire suppression only supports firefighters working on the ground. Unfortunately, the public, elected officials, and even some firefighters, believe that aircraft are a singular solution to wildfire suppression. This belief is not true and must be understood regardless of the possibilities included in this chapter. The options outlined in this chapter may, however, help keep wildfires small and more manageable.

[232] Keating et al., *Air Attack Against Wildfires: Understanding U.S. Forest Service Requirements for Large Aircraft*, 9.

Based on the analysis of the data reviewed regarding the use of military aircraft during civilian wildfires, this chapter outlines specific options, including "pros" and "cons" for each, with the final three options outlining opportunities for improvements to the current system.

## A. MAINTAIN THE EXISTING SYSTEM

The system could remain the same, as it currently exists. Both civilian and military aircraft would continue in the roles and responsibilities presently occupied. Laws, policies, doctrine, or procedures would not be changed. The military's DSCA and IRA would continue to be implemented where appropriate. Aircraft owned and contracted by federal civilian agencies would continue to be deployed prior to military aircraft. While the current system as outlined in this thesis is limited, maintaining the current system supports the findings of a 2004 OMB review regarding the use of military assets to suppress wildfires. The OMB report recommends that the existing laws that regulate the use of military aircraft remain intact without modification. The report does, however, make other minor recommendations regarding information sharing, communication, and training.[233]

### 1. Pros

Maintaining the existing system is an attractive option because the people and agencies involved are accustomed to and experienced with the arrangement. Maintaining the existing system is convenient and easy. No changes are required to existing laws. Federal civilian fire agencies, such as the USDA, the DOI, and their component agencies, would continue to implement current policies and procedures while also continuing to operate under their interagency agreement with the DOD.[234] Current DOD directives and instructions would not require any modification; existing training and preparedness

[233] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 13. This report recommends no changes to the existing system, including the Economy and Stafford Acts.

[234] United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense, *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*, 1.

would continue in their current format. Finally, as noted in the OMB report, the Economy and Stafford Acts are effective as written and do not require revision.

### 2. Cons

The limitations to utilizing military aircraft during civilian wildfires as outlined in this thesis remain in place. DOD aircraft would not be requested until all civilian wildfire aircraft are deployed. Interagency hesitation to request military support continues. Critical delays in the assignment of potentially closer military aircraft would endure. Confusion from the public regarding the DOD's roles and responsibilities would continue to be voiced. Finally, the conflict between the Economy Act and the DSCA would not be resolved.

## B. ELIMINATE THE USE OF DOD AIRCRAFT FOR SUPPRESSION DURING CIVILIAN WILDFIRES

Another option is that the military be eliminated from consideration for the use of its aircraft for suppression purposes during civilian wildfires. This approach, while seemingly simple, has multiple ramifications. In fact, the option to eliminate the DOD from wildfire suppression might be the most controversial, as citizens have come to expect that military aircraft will respond to civilian wildfires. The precedent setting history of military aircraft responding to civilian wildfires may be too much to overcome for this option to be implemented. However, this position has been argued previously. Geoffrey Glickstein, in a NPS thesis, suggested that the DOD move its wildfire capabilities to a newly created organization that would be known as the United States Fire Guard (USFG). He argues that the USFG could be modeled after the U.S. Coast Guard (USCG).[235]

In addition, it is worth noting that neither Canada nor Australia incorporate their respective military's aircraft in the direct suppression of wildfires. Military aircraft in Canada and Australia are only utilized in support roles and are not used for fire

[235] Geoffrey L. Glickstein, "Improving Air Support for Wildfire Management in the United States" (master's thesis, Naval Postgraduate School, 2014).

suppression. The approach taken by Canada and Australia is outlined in Appendix B and may be instructive for the United States.[236]

### 1. Pros

A benefit to the DOD is that its wildfire responsibilities would be transferred to the USFS and other federal agencies. The DOD, then, could divest itself of a mission that is not consistent with its national defense mission. In addition, the use of aircraft not designed for wildfire suppression would be eliminated. The aircraft that utilize MAFFS have less capability and are generally more expensive than comparable civilian air tankers. Flying MAFFS-equipped aircraft to assist in wildfire suppression is dangerous. By eliminating military aircraft for wildfire suppression use, military personnel would not be exposed to flying in hazardous conditions during peacetime. A MAFFS equipped DOD aircraft from North Carolina crashed during a wildfire while deployed to South Dakota in 2012. Four of the six crewmembers died in the crash.[237] Had DOD aircraft not been deployed, the accident would have been avoided. Of note, the military would likely maintain some aerial firefighting capabilities for fire suppression on its own training facilities to address fires that start due to training involving live weapons fire.

For federal civilian agencies with firefighting responsibilities, the benefit to not having the DOD involved is simply less confusion regarding the deployment of aircraft. First, NICC procedures would be streamlined with regard to aircraft management and deployment. The staff would have less procedural steps to navigate regarding the distribution of aircraft for suppression purposes. Second, less coordination would be required during incidents. Military aircraft utilize different communications (but have access to civilian communication frequencies), require a lead plane (commercial tankers qualified in initial attack do not require a lead plan), and have different rules regarding

[236] See Appendix B for specific information regarding how Canada and Australia deploy their respective militaries to civil emergencies, including military aircraft during civilian wildfires.

[237] United States Air Force, *Air Mobility Command, United States Air Force Aircraft Accident Investigation Board Report* (C-130H3, T/N 93–1458) (Scott Air Force Base, IL: United States Air Force, 2012), 1, http://usaf.aib.law.af.mil/ExecSum2012/C-130H3_Edgemont_SD_1%20Jul%2012.pdf.

their flight hours (military aircraft are prohibited from night operations).[238] The perils of mixing civilian and military aircraft in a very dangerous environment would be removed if DOD aircraft were not involved in response to civilian wildfires.

### 2. Cons

The first downside to eliminating DOD aircraft from the civilian environment is that a capability would be removed from an already stressed system. The military is considered a "surge" resource when civilian aircraft are not available.[239] The military's surge capability would be eliminated from the arsenal of resources currently available. Another negative for the military is that citizens may demand that this service continue to be provided, which is especially true when military aircraft are located nearby wildfire situations.

When a wildfire occurs that results in the loss of life, property, infrastructure, and natural resources while nearby military aircraft were not deployed, public outcry will put pressure on both civilian fire agencies and the military. Citizens may feel less safe and betrayed by a system that did not permit the best possible chance for their survival. The military has been involved in wildfire suppression since 1973 as directed by Congress.[240] It will be difficult to explain to citizens who have been impacted by fire why a resource that has been used for 42 years is no longer available.[241] Prior to that time, however, military aircraft were not involved in wildfire suppression. The option to eliminate military aircraft could be a return to that time. Finally, the DOD has a much greater budget than its civilian counterparts. Comparatively, it may appear to be budgetary "nitpicking" when a large and well-funded federal agency eliminates a service that it arguably can afford.

---

[238] "MAFFS Q&A," April 23, 2015, http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3836600.pdf, 6.

[239] Ibid., 1.

[240] Barry D. Smith, *Fire Bombers in Action* (Osceola, WI: Motorbooks International Publishers and Wholesalers, 1995), 43.

[241] "MAFFS Q&A," 2.

## C. UTILIZE DOD AIRCRAFT MORE FREQUENTLY VIA THE IRA

An option for improving DOD response to civilian wildfires is that military aircraft should be considered for immediate use with all other available aircraft.[242] The existing system requires all civilian aircraft to be engaged in fire suppression before DOD assistance can be requested. Oftentimes, military aircraft are available but sit idle for fear of "competing" with the private sector. As noted previously, responding to civilian wildfires is not the DOD's primary mission. However, if DOD aircraft were immediately considered under the IRA, the closest available and appropriate resource would be dispatched. The IRA doctrine of DSCA would not require modification to implement this option.

Dispatching the closest available aircraft to civilian wildfires, regardless of whether the aircraft is civilian or military, results in many benefits. For example, the time for the aircraft to arrive at the wildfire and begin working may be decreased. Decreasing the arrival time of aircraft is important to prevent the wildfire from spreading beyond the control of IA resources. Although the cost of aircraft is high, their cost is justified when aircraft keep the fire small. The comparison is spending thousands of dollars to prevent the fire from extending or millions of dollars to suppress the fire after it is beyond local control.

An example of cost-containment is the state of Colorado's approach to aircraft and wildfire. In 2014, Colorado decided to purchase and contract aircraft for the express purpose of responding to wildfires more quickly.[243] Given the total cost of recent wildfires in the state, the expense of the aircraft to prevent the spread of wildfires was determined to be more effective than the total cost of potential fires.[244] Colorado made

---

[242] Many of the concepts outlined in this option were developed in a personal conversation with Captain Eric Saylors of the Sacramento (CA) Fire Department on January 13, 2015.

[243] Colorado Department of Public Safety, Division of Fire Prevention and Control, *Special Report: Colorado Firefighting Air Corps, Report to the Governor and General Assembly on Strategies to Enhance the State's Aerial Firefighting Capabilities* (Lakewood, CO: Colorado Department of Public Safety, Division of Fire Prevention and Control, 2014).

[244] The Hayman Fire of 2002 cost approximately $39,100,000 to suppress while the Waldo Canyon Fire of 2012 cost approximately $20,000,000 and the Black Forest Fire of 2013 cost approximately $10,000,000.

the decision to invest in aircraft for wildfire suppression partly because the current national system for deploying aircraft was deemed too unreliable and using nearby military aircraft too restrictive.[245] Having the ability to respond quickly to wildfires is supported by both national and state goals. The *2015 Interagency Standards for Fire and Fire Aviation Operations* states:

> Fires are easier and less expensive to suppress when they are small. When the management goal is full suppression, aggressive initial attack is the single most important method to ensure the safety of firefighters and the public and to limit suppression costs.[246]

The state of Colorado supports this philosophy by stating:

> Fast and aggressive initial attack on new fires (for fires where full suppression efforts are the appropriate management response) can reduce the number of mega fires that may burn hundreds of homes and cost the taxpayers tens of millions of dollars in suppression costs.[247]

Colorado's wildfire suppression goal says, "DFPC's goal for wildfire management is to keep all wildfires with values at risk smaller than 100 acres and to suppress all fires in Wildland Urban Interface (WUI) areas at less than ten acres, 98 percent of the time."[248] The option to utilize all aircraft, including DOD airplanes and helicopters, is supported by the NWCG's and the state of Colorado's goals.

#### 1. Pros

The primary benefit to utilizing DOD aircraft in conjunction with all other aircraft during civilian wildfires is the decrease in overall costs to suppress wildfires. Although utilizing aircraft is expensive, early use of aircraft can keep to total cost to a minimum. In fact, the use of aircraft is often the largest expense in the suppression of wildfire. The cost of aircraft used to suppress wildfire can vary widely depending on the type of aircraft

---

[245] See Chapter II regarding the use of aircraft during the Hayman Fire.

[246] National Interagency Fire Center, *Interagency Standards for Fire and Fire Aviation Operations* (NFES 2724) (Boise, ID: National Interagency Fire Center, 2015), 01–09.

[247] Colorado Department of Public Safety, Division of Fire Prevention and Control, *2014 Colorado Firefighting Air Corps Aviation Plan* (Lakewood, CO: Colorado Department of Public Safety, Division of Fire Prevention and Control, 2014), 5.

[248] Ibid.

(helicopter versus airplane) and the capabilities of the aircraft. For example, in 2013, the smallest helicopter cost $225 per hour while the largest airplane cost $23,300 per hour.[249] Although the daily cost can be very high, many times it is still less expensive to have the fire suppressed sooner, when fewer aircraft are needed, than for the fire to grow and require multiple aircraft for multiple operational periods. When fewer aircraft are needed because fires are kept small, the entire system can be better coordinated to have more aircraft available for fires when they first start, and the total cost to suppress a wildfire is decreased.

The NIFC, through the NICC, organizes and coordinates the response of aircraft (and other wildfire resources) to fires throughout the country.[250] Providing the NICC the standing ability to consider the immediate use of military aircraft for civilian wildfires via the IRA increases the pool of aircraft to assign to wildfires. Given the geographic distribution of military assets, the availability to consider DOD aircraft would permit the NICC to move USFS owned and contracted aircraft to areas distant from military installations. Incorporating both civilian and military aircraft in a coverage plan will provide the distribution of aircraft to cover more area for the first response. The NICC already has maps identifying VLAT bases with a 250-mile nautical range and MAFFS bases with a 150-mile nautical range.[251] Working in partnership with its regional GACCs,[252] the NICC could further develop similar maps to coordinate helicopter and air tanker kind, type, location, and range. The end result is that the response time to wildfires is shorter. Developing maps identifying the nautical ranges of all types of firefighting aircraft, while a daunting task, would permit the fire to be attacked from the air before it grows too big to quickly contain.

---

[249] Fennel, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success*, 42.

[250] "About Us," accessed August 13, 2015, http://www.nifc.gov/nicc/about/about.htm.

[251] "2014 DC-10 Bases with 250 Nautical Mile Range," accessed May 21, 2014, http://www.nifc.gov/nicc/logistics/aviation/VLAT_Bases.pdf; "2014 MAFFS Bases with 150 Nautical Mile Range," accessed April 11, 2014, http://www.nifc.gov/nicc/logistics/aviation/MAFFS_Bases.pdf.

[252] "National Geographic Area Coordination Center website Portal," accessed October 4, 2015, http://gacc.nifc.gov/.

Having more aircraft that can respond quickly to support the extinguishment of wildfire also results in less destruction to lives, property, infrastructure, and the natural resource. Simply stated, less damage occurs. Decreasing overall damage is also less expensive. As noted in a 2013 CRS report, wildfires can occur as a "surface fire" (needles, leaves, and grasses within approximately one foot of the ground) or a "crown fire" (fuels from ground level through the tops, or crowns, or trees).[253] The report further states that surface fires, "Are relatively easy to control" when contrasted with crown fires that, "Are difficult, if not impossible, to control."[254] Deploying aircraft to maintain wildfires as surface fires are important to decrease the overall damage caused by wildfires.

### 2. Cons

Utilizing DOD assets is not without concern. First, and as noted previously, responding to civil emergencies is not the DOD's primary responsibility. The use of military aircraft and crews during civilian wildfires removes equipment and personnel from their national defense mission. Gaining support from the DOD to implement a more active first response role for its people and equipment may not be well received.

Next, because civilian support is not the DOD's primary responsibility, their aircraft may not be available when it is needed for a civilian wildfire. Relying on a resource that could be unavailable during an emergency is risky. Emergency planners must account for the military's primary mission in their plans and prepare for situations that will only involve civilian aircraft. Even though it is unlikely that all military aircraft would be unavailable at the same time, planning and coordination of civilian and military resources will necessarily be dynamic. Considering workload and coordination of effort, the possibility that military aircraft might not be available may make management of the system prohibitive for both DOD planners, as well as for personnel at the NICC.

---

[253] Kelsi Bracmort, *Wildfire Damages to Homes and Resources: Understanding Causes and Reducing Loses* (CRS Report No. RL34517) (Washington, DC: Congressional Research Service, 2013), 5.

[254] Ibid.

Planning for this variability does not include the fact that even with all military aircraft available to respond to wildfires, the potential exists that not enough air resources may be available during busy fire seasons. Given the lack of USFS aircraft, adding the DOD into the equation will help but will not be the final solution. The NICC will still have to prioritize requests and triage which fires can be prevented from becoming large incidents, as well as which fires have the most values at risk. The NICC and its partner dispatch centers regularly triage resources; as such, the skill of resource management is a task that will have to be reinforced.

Finally, involving military aircraft in the same role as all other aircraft may result in the perception that government is directly competing with private industry. Private aircraft contractors could make a claim that the DOD is taking away its business. This concern could be decreased by changing federal law or by adjusting the policies and doctrine currently in use. The concern that private contractors might claim unfair practices by the federal government is not anticipated as military aircraft are currently deployed under the IRA. Complaints from private aircraft operators do not appear to have occurred as a result of the military's role in DSCA, as no complaints were uncovered during the research.

## D. UPDATE EXISTING LAWS

Another option for improving the DOD's response to civilian wildfires is to update existing laws. Two examples of laws found during this research that can be improved to enhance the use of military aircraft during civilian wildfires are the Economy Act and the Stafford Act.[255] Both laws must be modified to encourage, rather than discourage, the use of military aircraft to assist in suppressing civilian wildfires.

The Economy Act was established in 1932 and still influences the way DOD aircraft are utilized during civilian wildfires. The Economy Act was enacted prior to the use of aircraft, both fixed wing and rotary wing, being used to suppress wildfire and needs to be updated to reflect modern realities. The Economy Act was perceived to be a

[255] Money and Finance, 31 U.S.C. § 1535 (2003); The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

barrier by two persons when discussing the military's efficiency and effectiveness in support of civilian wildfires.[256] In addition, the Economy Act does not address emergency situations.

Updating the Economy Act to include reference to emergencies due to wildfires is not without precedent. The Act currently includes language regarding emergencies. The first reference is in section 322 (General Authority of the Secretary) and references "emergency preparedness functions." The language permits the Secretary of the Treasury to authorize the use of agency aircraft in support of law enforcement operations. Specifically, this amendment to the Economy Act states:

> The Secretary of the Treasury is authorized in fiscal year 1996 and hereafter, to use Treasury Department aircraft, with or without reimbursement, to assist bureaus within the Department of the Treasury or other Federal agencies, Departments or offices outside of the Department of the Treasury to provide emergency law enforcement support to protect human life, property, public health, or safety.[257]

A similar amendment should be included for the use of other federal agency aircraft (such as the USDA, DOI, and DOD) during an emergency. A second example that already exists is in section 1344 of the Economy Act concerning transportation emergencies. Section 1344 states that funds may be expended when, "Highly unusual circumstances present a clear and present danger, that an emergency exists, or that other compelling operational considerations make such transportation essential to the conduct of official business."[258] Emergency considerations for law enforcement and for transportation provide the precedence for expanding the use of emergency language within the Economy Act to include the response of DOD aircraft to civilian wildfires.

Although the Stafford Act was written expressly for emergency situations, its primary limitation in the context of DOD aircraft used during civilian wildfires is that it reinforces the Economy Act's direction of non-competition. In addition, the Act also

---

[256] O'Brien, FEMA Region 10 Defense Coordinating Element staff member; MAFFS pilot, in discussion with the author, May 5, 2015.

[257] Money and Finance, 31 U.S.C. § 322 (2011).

[258] Ibid.

expressly limits the time period that federal resources, such as the DOD's assets, may be engaged. The Stafford Act does not require major changes but can be addressed with minor wording improvements. More importantly, training for those responsible for requesting DOD assets via the Stafford Act must be accomplished so that current restrictions are more thoroughly understood and applied.

The Stafford Act states that "preference" should be given to private businesses with the capability to deliver a desired service and that emergency work by federal assets will be limited to 10 days.[259] This chapter's suggestion for updating existing laws is applicable to eliminating the language that preference should be given to private providers, especially for specialized items, such as aircraft. In addition, the Stafford Act limits the use of DOD resources "For the preservation of life and property for a period not to exceed ten days." The Stafford Act's language is unnecessarily restrictive and a provision to continue the use of DOD assets beyond 10 days when life and property is at stake should be established.

The OMB has previously reviewed the Economy and Stafford Acts for their impact to wildfire suppression. Completed in 2004, the OMB report found, "No changes in the Economy Act or the Stafford Act are necessary to ensure that military resources are made available and are used, as necessary and appropriate, for wildland firefighting "[260] The OMB report did offer four suggestions to enhance the understanding of using DOD aircraft during civilian wildfires. However, over 10 years later, those four OMB suggestions have not been fully implemented.[261] The options suggested in this thesis to update both the Economy and Stafford Acts do not support the OMB report's conclusions. The OMB concluded that both the Economy and Stafford Acts are sufficient as written when considering the use of DOD aircraft for civilian wildfires.

---

[259] Federal Emergency Management Agency (592), *Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities*, 13, 112.

[260] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 13.

[261] Ibid., 14.

### 1. Pros

Updating both the Economy and Stafford Acts will help clarify the conditions under which military aircraft can be used to assist with civilian wildfire suppression. One benefit is that by adding language to the Economy Act to address emergency situations, available and nearby military aircraft could be utilized more quickly. Updating the Economy Act would pave the way for language in the Stafford Act to be changed. The result is that the closest available resource to the emergency could be dispatched, regardless of whether it is civilian or military. Updating the Economy Act to reflect this practice would eliminate the confusion regarding when to deploy DOD assets. In addition, having the nearest aircraft respond would result in less damage to people, property, infrastructure, and natural resources. These issues are addressed in more detail later in this chapter.

Revising the Stafford Act to eliminate the 10-day maximum response would provide for extended operations during such long-term emergencies as wildfires. The 10-day constraint is too restrictive for the use of military aircraft during civilian wildfires. It is not uncommon for uncontrolled wildfires to burn for extended periods of time. The Hayman Fire, for example, burned for 41 days in 2002 while the Waldo Canyon Fire burned for 18 days during 2012. Modifying the Stafford Act as suggested would permit military resources to be utilized for the duration of the incident or until the threat to life and property concludes.

Enacting these recommendations will help reduce confusion regarding the Economy and Stafford Acts. One of the suggestions from the OMB report states that confusion exists among the various agencies that implement the Economy and Stafford Acts for wildfire response. According to the report, the USDA, the DOI, and the DOD have all agreed to increase training within their agencies for the purpose of refining and strengthening processes, improving transparency, and preventing miscommunication.[262] This recommendation, however, has not been implemented; updating both the Economy and Stafford Acts to eliminate confusion would help meet the OMB's suggestion.

[262] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 14.

### 2. Cons

The primary difficulty with this option to modify the Economy and Stafford Acts is that making changes to any federal law is a difficult and time-consuming process. A member of Congress would have to sponsor an amendment to either Act and manage it through the process. Further, amendments would need a thorough legal review to ensure compliance with other laws and prevent unintended consequences. These difficulties are nothing new, however, and can be overcome with justification, patience, and perseverance. Indeed, laws are made and amended this way every day in the United States.[263]

Another challenge concerning updating existing laws is the definition of terms. Language must be carefully chosen to develop an amendment that is easily understood by all applying the law. For example, the term "emergency" can itself create confusion. According to the Stafford Act, emergency is defined as:

> Any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.[264]

The Stafford Act goes on to define the term "major disaster." "Major disaster means any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought)."[265] Although the definition includes many examples of events considered a major disaster, wildfires are not included. Given the increasing expenditures to suppress wildfires by the USG, and the USFS specifically, the term "wildfire" should be included in the definition of major disasters in the Stafford Act.

---

[263] "The Legislative Process," accessed October 4, 2015, http://www.house.gov/content/learn/legislative_process/.

[264] Federal Emergency Management Agency (592), *Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities*, 2.

[265] Ibid.

## E. ENCOURAGE GREATER USE OF RESOURCE SHARING AGREEMENTS

Another option to improve response to wildfires is that local governments should be encouraged to establish resource-sharing agreements directly with DOD installations in their geographic region. The option to create resource-sharing agreements between local governments and DOD installations is encouraged by DOD doctrine and is permitted to take many forms. Examples of resource sharing agreements, also known as intergovernmental agreements, include numerous iterations, such as MOU, mutual aid agreements, and automatic aid agreements. Each was reviewed in Chapter III.

The use of local resource sharing agreements must be beneficial for all parties to the agreement. For example, not all military bases or installations have aircraft for response to wildfires. Also, agreements between geographically distant entities would be unreasonable due to travel time. Although possible, resource-sharing agreements must make sense for the local jurisdiction, as well as for the military. These agreements should not be "one way" in nature. Each party to the agreement must provide value-added to the other jurisdiction.

Examples of resource sharing agreements reviewed earlier in this thesis are the EMAC and the PPRMJRSP. The EMAC and its supporting documents is an example for local jurisdictions to follow that desire to enter into an agreement with a DOD post or base for the provision of deploying military aircraft to civilian wildfire incidents. The PPMJRSP is an example of a local agreement that could be considered for a more streamlined, efficient, and effective use of shared resources at the local level, especially during a fast-moving wildfire.

### 1. Pros

The use of resource-sharing agreements is beneficial for local jurisdictions primarily due to local control. "The ability to provide adequate resources in a timely manner will minimize the impact of an incident and prevent additional and unnecessary

loss."[266] Cooper's quote summarizes the impact of effective resource-sharing agreements. Both the local governmental and the military can pre-determine the expectations, assets, and financial arrangements that each side will bring to the table. Resource sharing also results in the development of plans by each partner. Knowing how each party to the agreement will respond creates efficiency of effort, increases trust, and provides a sense of control.

Resource-sharing agreements also augment local resources and reduce duplication of expensive assets. "One advantage of initiating an inter-local agreement is to provide local governments with additional resources and personnel."[267] Shared resources agreements result in a better use of taxpayer funds. For example, if a nearby military installation has a helicopter capable of dropping water on a wildfire, the local jurisdiction can rely on the DOD asset rather than attempting to purchase and maintain identical equipment. For many local governments, aircraft is likely beyond their financial ability. The local government may be responsible for the cost of the DOD's deployment depending on the terms of the agreement; however, the cost of a single response is less expensive than owning and operating a specialized resource infrequently used.

Financial benefits are also realized with shorter emergency response times due to pre-established resource-sharing agreements. With a written agreement in place, approvals are prepared prior to an emergency. The end result is a more timely response. Ultimately, faster response times are important due to the ability to mitigate the problem prior to the situation exceeding local capabilities. Faster response times and faster control of the fire results in less danger to human lives, less property damage, preservation of natural resources-and less overall cost.

Finally, resource-sharing agreements allow the parties of the agreement to meet each other outside an emergency environment. As noted in the USFS AAR from the

---

[266] Michael F. Cooper, "Implementing an Automatic Aid Agreement between Fire Departments" (Executive Fire Officer Program Applied Research Project, National Fire Academy, 1998), 5.

[267] Simon A. Andrew et al., "Intergovernmental Cooperation in the Provision of Public Safety: Monitoring Mechanisms Embedded in Interlocal Agreements," *Public Administration Review* 75, no. 3 (May/June 2015): 402.

Waldo Canyon Fire, "It's all about relationships."[268] The opportunity to meet under non-emergency conditions breeds familiarity. Having familiarity with a counterpart increases trust and cooperation. When relationship(s) have been established prior to an emergency, trust and confidence are improved. The desire is that acquaintance with colleagues helps create successful outcomes. Finally, Raymond Gretz, writing in a NPS master's thesis, states that advantages to resource sharing agreements can be summarized with, "Decreased response times to emergencies, better working relationships with neighbors, and possible cost savings."[269]

### 2. Cons

Resource sharing agreements with military installations have downsides. One example is that military assets may not be readily available to the local jurisdiction. The DOD must be prepared for its primary mission of war fighting. As such, local military assets may be unavailable because they are deployed outside the local area for training or for a mission. Simply stated, providing support to civilian authorities is not the reason that military installations exist.

Another weakness with resource sharing agreements is that they may be expensive. Depending on the negotiated terms of the agreement, the jurisdiction that requests assistance may be responsible for reimbursing the DOD for the use of its people and equipment. Military assets are not inexpensive. For example, when comparing the cost of similar aircraft used for fire suppression, the OMB reports that civilian aircraft cost an average of $10,844 per day while military aircraft cost an average of $20,265, nearly double.[270] Cost must be considered when local jurisdictions contemplate using DOD resources. Although the cost of military aircraft may be important to local jurisdictions, citizens whose property is at risk are not concerned with cost.

---

[268] Bob Houseman et al., *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service* (Lakewood, CO: United States Forest Service, 2013), 12.

[269] Raymond C. Gretz, "Assessing Automatic Aid as an Emergency Response Model" (master's thesis, Naval Postgraduate School, 2013), 41.

[270] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 10.

Further, local jurisdictions may be viewed as violating existing federal law regarding competition with private resources by accessing military aircraft. The federal government does not want to compete with private resources that can provide the required services. This research did not identify situations in which contractors challenged governmental entities at any level for utilizing DOD resources; however, it is possible that a challenge from private contractors could be made in the future.

## F. CONCLUSION

Chapter IV has discussed multiple options for the use of military aircraft in civilian firefighting, including no change to the present system, eliminating the use of military aircraft during civilian wildfires all together, legislative changes, incorporating DOD aircraft with civilian aircraft when making deployment decisions, and increasing the use of resource sharing agreements.

The last three options presented in this chapter may help limit a wildfire's growth through the earlier use of military aircraft. To be effective, however, these suggestions must address problems within the existing system. For example, the Economy Act is often cited as the reason that DOD aircraft are not dispatched to wildfires until all USFS owned or contracted are in use and is frequently referred to as the "non-compete" requirement. However, DSCA permits the use of military resources, such as aircraft during civilian wildfires, even though the non-compete expectation has not necessarily been met. The difference in expectations between the Economy Act and the DSCA is one example of a problem within the existing system. Considering the final three options presented in this chapter may improve the response of firefighting aircraft to wildfire.

The primary benefit of the last three options suggested is that wildfires may be prevented from becoming crown fires. Wildfires that do not become crown fires are more easily controlled. The end result is less damage and less overall cost. While the use of aircraft cannot be considered the only tool needed to suppress wildfires, it is an option that must be made more readily available to support civilian communities at risk from wildfires.

# V. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research was to identify inefficiencies with the current system of incorporating DOD aircraft in the response to civilian wildfires. Improving access to military aircraft during civilian wildfires is necessary according to the USFS AAR of the 2012 Waldo Canyon Fire in Colorado. The report states, "Items that can be enhanced included the role of the military, utilization of military assets, and the utilization of MAFFS on the incident."[271] Improvements to the use of military assets are needed despite that fact that the USFS and the DOD already have policies, procedures, doctrine, and guidance in place for the items described previously. In fact, the *2015 Direction to Wildland Fire Leadership* memorandum from the Secretary of Agriculture and the Secretary of the Interior allude to the need for shared resources. Referencing, "Firefighting asset prioritization and allocation decisions," the Secretaries state, "We recognize that additional firefighting resources and assets may be required" for the control of wildfires.[272] The need for inter-agency cooperation is essential for success in the wildfire community and the inefficiencies uncovered during the research for this thesis led to the following findings.

The system in place provides for the deployment of DOD aircraft to civilian wildfires; however, it incorporates too many restrictions, is not timely, and is confusing to implement. Examples of the restrictions are specific laws and policies. The Economy Act[273] has been identified as the major limiting factor in the deployment of military aircraft to civilian wildfires. The Act includes a non-compete clause that often delays requests for military assets to ensure that all civilian aircraft are engaged. Only when all civilian aircraft are deployed do the USFS and other federal agencies with wildfire

---

[271] Houseman et al., *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service*, 9.

[272] United States Department of Agriculture and United States Department of the Interior, *Memorandum, 2015 Direction to Wildland Fire Leadership. Secretary Sally Jewell and Secretary Thomas J. Vilsack to Chief, U.S. Forest Service; Director, Bureau of Land Management; Director, National Park Service; Director, U.S. Fish and Wildfire Service; Director, Bureau of Indian Affairs*, June 4, 2015.

[273] Money and Finance, 31 U.S.C. § 1535 (2003).

responsibilities consider the use of DOD assets. The Stafford Act[274] was established to direct the USG's response to large-scale emergencies. However, two limitations within this law must be rectified. The Stafford Act includes the same bias to non-competition that the Economy Act references. Both the Economy and Stafford Acts referencing the need to limit competition with private resources is problematic when considering specialized resources, such as aircraft. In addition, the Stafford Act restricts the time that federal resources can be deployed for emergencies to 10 days. In the case of large wildfires, the 10-day limitation is too restrictive, as many wildfires last much longer than 10 days. Examples depict the reality. According to the NWCG website, "InciWeb" on October 6, 2015, at least three wildfires had burned for more than 50 days and were still burning (the Rough Fire in California, the Tepee Springs Fire in Idaho, and the Grizzly Bear Complex in Oregon).[275] Regarding the use of a specialized resource, such as aircraft, the Economy and Stafford Acts are too restrictive.

The current system is not timely. As a result of the desire to limit competition with private business, in this case aircraft contracted by the USFS and other federal agencies, military aircraft are usually requested after the fire has already escaped the initial attack (IA) and become a crown fire. As previously noted, these fires are extremely difficult to contain and extinguish.[276] Utilizing DOD aircraft similarly to civilian first responders would activate those resources as soon as a fire is reported. In addition to the firefighters on the ground, the nearest air support—sometimes military aircraft—provides the best opportunity to maintain the fire as a surface fire where it is easier and often faster to extinguish. Fires controlled in a timely manner cost less to fight and free critical resources, such as aircraft, to be prepared for the next incident.

Finally, another concern with the current system is the confusion surrounding the multiple laws, regulations, and agreements regarding the use of military aircraft during civilian wildfires. Confusion and miscommunication among applicable agencies was

---

[274] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

[275] "Current Incidents," accessed October 6, 2015, http://inciweb.nwcg.gov/.

[276] Bracmort, *Wildfire Damages to Homes and Resources: Understanding Causes and Reducing Loses*, 5.

cited in a 2004 OMB report,[277] and remained almost 10 years later after the Waldo Canyon Fire. The first item listed from the USFS Waldo Canyon Fire AAR as a national priority in the *Lessons Learned/Observations and Recommendations* states, "At the national level we need clarification of roles and missions when dealing with the military and for working together to manage incidents, share resources, etc. Who can call them in? Who pays for them? How?"[278] Civilian researchers writing in *Public Administration Review* recognize this need and state, "Responding to large wildfires requires actors from multiple jurisdictions and multiple levels of government to work collaboratively."[279] Having clearly established laws, doctrine, procedures, and agreements improves collaboration and decreases confusion and miscommunication.

Another source of confusion is the conflict regarding when the Economy Act is applicable versus when IRA is applicable. The Economy Act directs that USG agencies not compete with private business. However, the DOD is authorized via the IRA, "To save lives, prevent human suffering, or mitigate great property damage."[280] During wildfires, DOD commanders who respond under IRA prior to the arrival of available civilian aircraft could be in violation of the Economy Act. The conflicting language of the Economy Act and IRA should be clarified to eliminate confusion when civilian operators and/or military planners are attempting to determine the appropriate resource to dispatch to wildfires. The military can and does deploy aircraft to civilian wildfires. However, the current system is inefficient and can be improved.

## A. CONCLUSIONS

Based on the findings from this research, the current process for utilizing military aircraft during civilian wildfires is cumbersome and confusing. The system, which is

---

[277] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 11.

[278] Houseman et al., *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service*, 10.

[279] Fleming, McCarta, and Steelman, "Conflict and Collaboration in Wildfire Management: The Role of Mission Alignment," 445.

[280] United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit*, 3–3.

based on traditional guidelines from both civilian and military practice, is outdated, inefficient, bureaucratic, and unnecessary. Civilian and firefighter lives are risked, personal property is destroyed, natural resources are devastated, and public infrastructure is endangered. While the use of aircraft cannot be considered the only tool needed to suppress wildfire, it is an option that civilian fire managers believe is essential to protect civilian communities at risk from wildfire.

The NIFC has processes in place for the utilization of military aircraft to assist in the suppression of civilian wildfires. These processes include written procedures, a DOD liaison to the NIFC, and an established process for the civilian wildfire community to request DOD support. Due to its use of military assets, including aircraft, the NIFC has created a *Military Use Handbook*[281] to guide both civilian and military personnel in the intricacies of operating military resources during civilian wildfires. In addition, the NIFC has other manuals to guide the use of military resources. These include the *National Interagency Mobilization Guide*[282] and the *Interagency Aerial Supervision Guide*.[283] Unfortunately, most of the instruction provided alludes to the difficulty of requesting DOD support, as well as the limitations under which military aircraft operate. Directives to utilize all civilian aircraft prior to engaging the DOD is also well entrenched within the NIFC's systems.

The DOD, then, also has established procedures for interfacing with the civilian community during wildfires. DOD fire departments are encouraged to establish mutual aid agreements with neighboring jurisdictions, as well as to be prepared to support missions for DSCA. DOD instructions also mention by name the NIFC, the NICC, and regional GACCs. Most importantly, the DOD recognizes its role in response to civilian emergencies with its DSCA responsibilities and the IRA. Both processes provide DOD leadership with the ability to respond to emergencies, such as wildfires in the civilian arena. The IRA is generally used for short-term incidents while DSCA is a longer-term commitment. NGB assets may also be called on when in Title 32 status. Last,

---

[281] National Interagency Fire Center, *Military Use Handbook*.

[282] National Interagency Fire Center, *National Interagency Mobilization Guide*.

[283] National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide*.

reimbursement is always considered and is addressed in military directives. Like the NIFC's systems, the DOD's systems permit the use of military aircraft during civilian wildfires. The problems with the current system lie in the inefficiencies built into the processes.

Current laws, such as the Economy Act,[284] the Stafford Act,[285] the Insurrection Act,[286] and the Posse Comitatus Act,[287] limit the ability of the DOD to work with other federal agencies and civilian leaders. The Economy Act is outdated and needs to be rewritten to improve the efficiency with which appropriate assets, in this case military aircraft, can be accessed to impact the outcome of a civilian wildfire positively. The Stafford Act should be clarified to limit errors in interpreting how it is to be implemented. In addition, Congress should reconsider other suggestions made in a 2004 OMB report reviewing the Economy and Stafford Acts.[288] Although 10 plus years have passed, the report and its suggestions are still applicable. The Insurrection Act may be amended to specify specific times that the President may take independent action to cause military aircraft to become engaged in wildfire suppression. Although amending the Insurrection Act may have negative consequences regarding "local control," such an act may be the right thing to do for saving lives and preserving the natural environment. Finally, Posse Comitatus is generally not seen as a barrier to deploying military aircraft to civilian wildfires. However, its language may be improved to eliminate any doubt regarding the wildfire suppression role for military personnel and equipment.

## B. RECOMMENDATIONS

The system for utilizing military aircraft during civilian wildfires can be improved from its current format. Based on the findings from the research for this thesis, two recommendations are offered. The first recommendation is to coordinate the use of DOD

---

[284] Money and Finance, 31 U.S.C. § 1535 (2003).

[285] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 (2010).

[286] Insurrection Act, 10 U.S.C. §§ 331–335 (1807).

[287] Posse Comitatus Act, 18 U.S.C. §1385 (1878).

[288] Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*.

aircraft more closely with civilian aircraft by utilizing the IRA more regularly. The second recommendation is to update the Economy and Stafford Acts, two federal laws that impede the response of military aircraft to civilian wildfires.

First, the DOD could be utilized as a "first responder," considered similar to law enforcement officers, firefighters, emergency medical technicians, and wildfire technicians, through the IRA. The advantage to this recommendation is that firefighting aircraft of any kind are dispatched as soon as a fire is known. Known by many different names, the term "location based dispatching" (LBD) is one name for deploying the closest appropriate resource to the emergency. Utilizing the military in this manner is one way to augment civilian resources. In addition, to mitigate possible concerns regarding competition with private resources, the military can and should return to its home base upon the arrival of appropriate civilian resources. More closely coordinating the use of military and civilian aircraft, based on procedural changes and the expanded use of the existing IRA, does not require the amendment of any laws but would result in faster response times in the critical early hours of a wildfire to assist in the goal of keeping wildfires small.

The second recommendation is to update the Economy and Stafford Acts. The Economy Act has been in effect since 1932 and represents the USG's long-standing desire to provide opportunities to private business. However, the law is written in a broad manner, stating specifically that an order for resources with another agency may be requested if the, "Ordered goods or services cannot be provided by contract as conveniently or cheaply by a commercial enterprise."[289] For many years, this single Economy Act sentence has been viewed as a restriction regarding the use of military aircraft. Unfortunately, the law does not directly consider specialized resources (such as aircraft) or emergency situations. For those times when lives and property are at stake, it is reasonable to exempt this requirement for the greater good. In fact, the language from the DOD's IRA could be used as a model to assist in defining "emergency situations." Although modifying this law would probably be an admittedly long process, the

[289] Money and Finance, 31 U.S.C. § 1535 (2003).

Economy Act could be amended to clarify these two items; thereby, improving the ability for DOD assets to be engaged more quickly during emergency situations, such as wildfires.

## C. FUTURE RESEARCH

This thesis is limited in scope and is not an exhaustive review of all issues surrounding the use of military aircraft during civilian wildfires. Opportunities for additional research are available. One example is the overall cost of fire suppression and efforts to decrease this expenditure. Another example is to expand the DOD's current capabilities for wildfire suppression, including whether an expanded wildfire responsibility would impact its national defense mission. Two examples that are not directly related to the use of aircraft, but that could lessen the need for aircraft, are related to mitigation strategies. First, forest health and mitigation policies could be researched to diminish the number of wildfires; thereby, reducing the need for aircraft support. Second, laws and/or regulations to decrease further development into the WUI might be a strategy to decrease the possibility of wildfires, again decreasing the need for suppression by aircraft. Each of these examples are not considered in this thesis but could be topics for future study to improve the use of military aircraft further during civilian wildfires.

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX A. THE HISTORY AND USE OF AIRCRAFT FOR WILDFIRE

In 1905, President Theodore Roosevelt established the USFS as we know it today.[290] What has come to be known as the "Big Blowup" occurred in the forests of Idaho, Montana, and Washington in 1910, burning more than three million acres within two days. The Big Blowup forced the fledgling USFS to reassess its role in forest fire suppression. In 1911, the Weeks Act, named for Massachusetts Congressman John Weeks, was signed into law by President William Howard Taft. Among other requirements, fire protection in the forests was established "Through federal, state, and private cooperation."[291] The Weeks Act has also been credited with the establishment of a "Framework between the federal government and the states for cooperative firefighting (the framework would later include private forest associations and landowners). By offering financial incentives to states to fight fires, the Forest Service came to dominate and direct what amounted to a national fire policy."[292] As forest firefighting became a major element of the USFS, the use of aircraft also developed.

Experiments began to advance the use of aircraft to assist in wildfire suppression efforts early in the 20th century. Ideas to take advantage of the relatively new field of aviation for firefighting efforts began 12 years after the first successful airplane flight in 1903. Early experimenters included the USFS, the Army Air Service, and the Los Angeles County Fire Service.[293] However, according to the USFS, "The successful

---

[290] "Our History," accessed July 26, 2015, http://www.fs.fed.us/learn/our-history. The USDA was established in 1862, and in 1876, the Office of Special Agent was established to monitor the status and health of U.S. forests. In 1881, the Division of Forestry was established. The Forest Reserve Act of 1891 was passed and "forest reserves" were under the management of the U.S. DOI.

[291] "The Weeks Act," accessed March 1, 2013, http://www.foresthistory.org/ASPNET/Policy/WeeksAct/index.aspx.

[292] "U.S. Forest Service Fire Suppression," accessed March 17, 2015, http://www.foresthistory.org/ASPNET/Policy/Fire/Suppression/Suppression.aspx.

[293] Development of Forest Service Aviation," accessed July 26, 2015, http://gacc.nifc.gov/oncc/logistics/crews/smokejumpers/about/fsaviationdevel.html.

combination of technology, personnel, and procedure for direct fire control eluded the Forest Service."[294]

## A. EARLY EFFORTS

The use of aircraft to support wildfire suppression was first contemplated during World War I. Experiments involving airplanes to detect wildfires from the air were conducted over Wisconsin by the USFS at the Trout Lake Headquarters in 1915 but were discontinued due to poor weather and communications.[295] Fixed wing aircraft were again used by the USFS, this time to spot wildfires from the air over California during 1917.[296] The first sustained use of airplanes to detect wildfires occurred above California in 1919 through a "Cooperative venture" between the USFS and the Army Air Service. This "Civilian-military effort" was later expanded to Idaho, Montana, Oregon, and Washington."[297] The USFS continued their trials during the 1920s, when dropping water and foam was attempted with tin cans, paper bags, and eight-gallon oak beer kegs suspended from parachutes.[298]

The USFS's next use of aircraft to support forest fire suppression was attempted in the late 1930s by dropping cargo from aircraft to firefighters on the ground. The first attempts were simply to drop supplies to the ground in a "free-fall" method. Later, burlap sacks and then parachutes were used to drop cargo.[299] During 1935, the Aerial Fire Control Experimental Project was implemented by the USFS in an effort to learn how to drop water and chemicals onto fires.

---

294 "Seeing Red: A Short History of Fire Retardant and the Forest Service," accessed July 26, 2015, http://www.fs.fed.us/fire/retardant/history.html.

295 "Development of Forest Service Aviation."

296 Ibid.

297 Ibid.

298 "Chapter 1: History of Smokejumping," National Smokejumper Training Guide-USFS-2008, July 26, 2015, http://www.fs.fed.us/fire/aviation/av_library/sj_guide/02_history_of_smokejumping.pdf.

299 "Development of Forest Service Aviation."

The development of better parachutes for dropping cargo led to "parachute jumping" by firefighters into fire areas.[300] The parachute jumping program was moved to Washington state in 1939 and the "U.S. Fire Service Smokejumper Project" became "fully operational" in 1940.[301]

Interestingly, from a homeland defense perspective during World War II, the Army Airborne's 555th Parachute Infantry Battalion was trained in "timber jumping and firefighting" due to concern for a Japanese "fire balloon" attack on western U.S. forests. These personnel were trained using techniques developed by the USFS's use of airplanes for the smokejumper program.[302] The partnership between the USFS and the Army is an early example of the civil-military interface for wildfire suppression, which complemented the USFS and Army Air Service efforts after World War I.

According to the USFS, "The first recorded water drop in 1930 used a Ford Tri-Motor airplane and a wooden beer keg filled with water."[303] It was not until 1955 that the first "free-flowing water airdrop" was used successfully. On August 13 in California's Mendocino National Forest, "A Boeing Stearman 75 Kaydet dropped 6 loads of water in support of ground firefighters. The operation successfully knocked-down the blazing fire."[304] Since that time, the USFS has experimented with and used a variety of military surplus aircraft for dropping both water and fire retardant to support the suppression of wildfires.[305]

Regarding the use of helicopters to support wildfire suppression, the USFS and the USA worked together to conduct experiments in 1945. In 1946, the Alaska Fire Service began to test helicopters during wildfires. These trials considered the use of

---

[300] "Development of Smokejumping," accessed July 26, 2015, http://gacc.nifc.gov/oncc/logistics/crews/smokejumpers/about/smkjdevel.html.

[301] Ibid.

[302] Ibid.

[303] "Seeing Red: A Short History of Fire Retardant and the Forest Service."

[304] Ibid.

[305] Ibid.

helicopters for "Aerial reconnaissance, scouting, and mapping."[306] On August 5, 1947, the first recorded operational use of a helicopter to support a wildfire occurred on the Bryant Fire in the Angeles National Forest. Two helicopters were used over multiple days to deliver firefighters to remote locations, deliver food and other supplies, provide mapping, and conduct reconnaissance.[307] With the success of those first missions, multiple recommendations were made to the Regional Forester, including the development of a water-dropping capability.[308]

Authors Peter Corley-Smith and David Parker report that the use of water buckets to drop water from a helicopter onto wildfire was developed in the early 1960s in British Columbia, Canada. Known as a "Monsoon Bucket," water was dropped through a 45-gallon barrel with a hole in the bottom. A trap-door was operated by the pilot to release the water above the fire.[309] The 1960s also saw the California Department of Forestry and Fire Protection (now known as CAL FIRE) experimenting with the use of water buckets and tanks mounted to helicopters to drop water on wildfires.[310] Water buckets for dropping water are known colloquially today as "Bambi Buckets®,"[311] which is the brand name of one of the first mass-produced buckets for dropping water from helicopters.

MAFFS systems were developed in the early 1970s. Congress directed that the military build a system to drop retardant from C-130 Hercules aircraft as a result of large fires in 1970. The first MAFFS unit "Was operational by late 1973."[312] Since 1973, MAFFS have been deployed over 6,700 times and dropped over 18 million gallons of fire

---

306 Michael Dudley and Gregory S. Greenhoe, "Fifty Years of Helicopter Firefighting," *Fire Management Notes* 58, no. 4 (Fall 1998), 6.

307 Ibid.

308 Ibid., 7.

309 Peter Corley-Smith and David N. Parker, *Helicopters in the High Country: 40 Years of Mountain Flying* (Victoria, British Columbia: Sono Nis Press, 1995), 61.

310 Smith, *Fire Bombers in Action*, 51.

311 National Wildfire Coordinating Group, *Glossary of Wildland Fire Terminology*, 34.

312 Smith, *Fire Bombers in Action*, 43.

retardant through 2003.[313] The MAFFS program is a joint effort between the USFS and the DOD. The USFS owns the MAFFS units while the DOD provides "The C-130 aircraft, pilots, and maintenance and support personnel to fly the missions."[314] MAFFS units are "portable" and are only loaded into the C-130 airplanes on an "as needed" basis.

MAFFS units contain six tanks, each carrying 3,000 gallons of retardant. According to author Barry Smith, two 18-inch diameter nozzles discharge the retardant via compressed air from the back of an open rear cargo ramp. The load is dropped all at one time in less than five seconds.[315] In 2009, "new generation" MAFFS units were deployed that are internally pressurized. Benefits of the "MAFFS II" units include the ability to deploy the load when the unit loses pressure, reduces the amount of ground support personnel needed to reload the system, and permits more missions to be flown on any given day.[316]

Regarding the use of MAFFS, Smith reports, "By law, they can only be used when all other civilian tanker assets are being used. This is to assure these military units don't take any business from the civilian operators."[317] The Air Force states that "MAFFS provide a 'surge' capability that can be used to boost wildfire suppression efforts when commercial airtankers are fully committed or not readily available."[318]

According to a 2013 GAO report, while MAFFs are approved by the Interagency Airtanker Board, they do have some limitations when compared to other air tankers used for fire suppression. First, the water or retardant that is dropped is narrower than when deployed by aircraft dedicated to wildfire suppression. The narrow distribution of water may permit fire to cross the suppression line more easily. Second, the water and retardant

---

313 Office of Management and Budget, *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires*, 1.

314 National Interagency Fire Center, *Modular Airborne Firefighting System: FAQ and Fact Sheet* (Boise, ID: National Interagency Fire Center, 2012).

315 Smith, *Fire Bombers in Action*, 43.

316 Department of the Air Force, *U.S. Air Force Fact Sheet: Modular Airborne Fire Fighting System (MAFFS)* (Colorado Springs, CO: Peterson Air Force Base 302nd Airlift Wing Public Affairs, 2015).

317 Smith, *Fire Bombers in Action*, 43.

318 Department of the Air Force, *U.S. Air Force Fact Sheet: Modular Airborne Fire Fighting System (MAFFS)*.

from MAFFS units is unable to penetrate dense forest canopies; therefore, it is less effective in heavy timber.[319] Finally, the large size of the aircraft, like other large air tankers, makes it less maneuverable in mountainous locations. Due to these limitations, MAFFS are most effective on grass and rangeland areas.[320] The limitations of MAFFS equipped aircraft is supported by a USAF Reserve pilot who stated during a personal interview that C-130 aircraft with MAFFS units had limited capabilities in mountain geography and deep canyons. He further stated that the MAFFS equipped aircraft were most effective during initial attack (IA) efforts.[321]

The USFS and the DOD maintain nine MAFFS units for eight aircraft; one of the nine units is maintained as a reserve. Two MAFFS units each are supported at three Air National Guard units. The 145th Air Wing (AW) is located in Charlotte, North Carolina at the Charlotte Air National Guard Base; the 153rd AW is located in Cheyenne, Wyoming at the Cheyenne Air National Guard Base; and the 146th AW is at Channel Islands, California at the Channel Islands Air National Guard Station. An Air Force Reserve unit maintains the final two units in Colorado Springs, Colorado at the 302nd AW at Peterson Air Force Base (PAFB).[322]

During previous wildfire seasons, "The military has provided firefighters and MAFFS support in several critical fire seasons, including 1989, 1990, 1994, 1996, 1998, 2000, 2001, 2002, 2003, 2004, and 2006."[323] MAFFS support only (no firefighters) was utilized during the fire seasons of 2007, 2008, 2011, 2013, and 2014. The DOD has provided both firefighters and MAFFS during the 2015 wildfire season. The year 2015 is

---

[319] Fennell, *Wildland Fire Management: Improvement Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success*, 27.

[320] Ibid.

[321] MAFFS pilot, in discussion with the author, May 5, 2015.

[322] Department of the Air Force, *U.S. Air Force Fact Sheet: Modular Airborne Fire Fighting System (MAFFS)*.

[323] "Fire Information, Military Support in Wildland Fire Suppression," accessed August 16, 2015, https://www.nifc.gov/fireInfo/fireInfo_military.html.

the first time since 2006 that both DOD active duty soldiers and aircraft have been deployed.[324]

## B. CURRENT EFFORTS

Today, federal, state, and local agencies utilize aircraft in the suppression of wildfire. The USFS manages a variety of aircraft, both airplanes and helicopters, via their Fire and Aviation Branch. According to a study by AVID, "The U.S. Forest Service draws from a supply of airtankers to meet the demand of aviation firefighting support, including a fleet of USFS-contracted airtankers and an additional supply, from cooperators including state-operated assets, military aircraft, and aircraft through international agreement."[325] The GAO reports, "The federal firefighting aircraft fleet includes some aircraft that are government owned, but most are obtained through contracts with provide industry vendors." A table in Appendix II of the report indicates that the USFS owned and contracted more than 1,350 aircraft for the 2013 wildfire season.[326] Aircraft are used during wildfire for the following tasks:

- Deliver equipment and supplies
- Deploy smokejumpers and rappellers to a fire
- Transport firefighters
- Provide reconnaissance of new fires, fire locations, and fire behavior
- Drop fire retardant or water to slow a fire so firefighters can contain it
- Ignite prescribed fires[327]

Other federal agencies, such as the Bureau of Land Management (BLM), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (USFWS) are all

---

[324] Lucy Perkins, "U.S. Army Soldiers Mobilized to Help Suppress Wildfires for First Time Since 2006," *National Public Radio*, August 17, 2015, http://www.npr.org/sections/thetwo-way/2015/08/17/432622212/u-s-army-soldiers-mobilized-to-help-suppress-wildfires-for-first-time-since-2006.

[325] AVID, LLC, *Firefighting Aircraft Study: Final Report* (AG-024B-C-12-0006) (Yorktown, VA: AVID, 2013), 36.

[326] Fennell, *Wildland Fire Management: Improvement Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success*, 9, 42.

[327] "Fire and Aviation Management—Aviation," accessed July 26, 2015, http://www.fs.fed.us/fire/aviation/.

involved with the use of aircraft for fire suppression on federal lands. Like the USFS, some of these federal agencies own and operate their own aircraft, as well as contract with private companies for fire suppression activities. Finally, all four agencies (USFS, BLM, NPS, and USFWS) partner to share resources.

Some states have developed programs for suppressing wildfires from the air. Two examples are California and Colorado. While California has a long history of utilizing aircraft in the suppression of wildfires, beginning in the 1960s, Colorado's program was established in 2014.

### 1. California

The state of California has a long history of wildfire. The California Department of Forestry and Fire Protection, now known simply as CAL FIRE, was established in 1855 as the Board of Forestry.[328] CAL FIRE historian Mark Thornton reports, "CAL FIRE is a State agency responsible for protecting natural resources from fire on land designated by the State Board of Forestry as State Responsibility Area (SRA)." Thornton also points out that CAL FIRE has two primary themes within its mission. The first is to protect merchantable timber from illegal logging activities. The second theme is to protect grass, brush, and tree-covered watershed in SRAs from wildland fires.[329] In addition to its wildland fire responsibilities, CAL FIRE has evolved into an "all-hazards" fire agency that provides the full spectrum of emergency response activities in 36 of the state's 58 counties. These services are provided via contracts with local governments. Regarding CAL FIRE's primarily wildfire mission, the organization annually responds to over 5,600 wildfires that burn some 172,000 acres.[330]

CAL FIRE first began using aircraft for fire suppression in 1954. Agriculture spray planes had been modified and were used to suppress brush and grass fires. The success of the program led CAL FIRE to begin using converted military aircraft on a

---

328 "CAL FIRE: What's in a Name?" accessed July 26, 2015, http://calfire.ca.gov/communications/downloads/fact_sheets/CALFIRE.pdf.

329 "General History, Part 1," accessed August 14, 2015, http://calfire.ca.gov/about/about_calfire_history.php.

330 "About CAL FIRE," accessed August 14, 2015, http://calfire.ca.gov/about/about.php.

contract basis for wildfire suppression in 1958.[331] CAL FIRE first used helicopters on a contract basis in the mid-1960s. The first agency-owned helicopters were purchased in 1981.[332]

The CAL FIRE aviation program has continually evolved throughout the years, utilizing a variety of both fixed wing and rotor wing aircraft. Currently, CAL FIRE operates 23 air tankers, 12 helicopters, and 15 air tactical airplanes. Air tactical airplanes such as lead planes and Air Tactical Group Supervisors (ATGS) provide coordination with the incident commanders on the ground and the aircraft over the wildfire, including directing air tankers and helicopters where to drop water and/or fire retardant.[333] Today, CAL FIRE reports, "From 13 air attack and nine helitack bases located statewide, aircraft can reach most fires within 20 minutes."[334] Additional aircraft for fire suppression are available to the state of California from private contractors, from the USFS, and from the DOD.

### 2. Colorado

The state of Colorado has also long experienced wildfire; however, the state has historically relied on the USFS, private contractors, and the DOD for wildfire suppression from the air. When compared to California's long aviation history, Colorado's state experience is in its infancy, beginning in 2014.

The primary state agency in Colorado for fire training, fire standards, fire prevention, and other fire service-related activities is the Colorado Division of Fire Prevention and Control (DFPC). The DFPC's mission statement is "To provide leadership and support to Colorado communities in reducing threats to lives, property and the environment from fire through fire prevention and code enforcement; wildfire

331 "Aviation History," accessed August 14, 2015, http://calfire.ca.gov/about/about.php.

332 "Aviation History, Part 2," accessed August 14, 2015, http://calfire.ca.gov/about/about_aviation_history2.php.

333 "CAL FIRE at a Glance," December 2014, http://calfire.ca.gov/communications/downloads/fact_sheets/Glance.pdf.

334 "Air Program," accessed August 14, 2015, http://calfire.ca.gov/fire_protection/fire_protection_air_program.php.

preparedness, response, and management; and the training and certification of firefighters."[335] The DFPC's goal for wildfire management is to "Keep all wildfires with values at risk smaller than 100 acres and to suppress all fires in WUI areas at less than ten acres, 98 percent of the time."[336]

After the devastating wildfires suffered by Colorado during 2012 and 2013, the DFPC was charged by the Colorado legislature in 2014 with taking a lead role in wildfire, including the use of aircraft for fire suppression. Colorado Senate Bill 13–245 compelled the DPFC to report to the Joint Budget Committee and the General Assembly the efficacy of establishing a "Colorado Firefighting Air Corps" (CFAC) with "Strategies to enhance the state's aerial firefighting capabilities."[337] Further, Colorado Revised Statutes (C.R.S.) 24–33.5-1228 authorized the DFPC to implement aerial firefighting efforts.[338] As a result of Colorado's legislative action, the CFAC was stood-up with the following mission statement:

> The CFAC Aviation Program provides for safe and efficient aviation services to meet DFPC's wildfire management goal. Utilization of technology, sound aviation management practices, and highly trained and motivated personnel will reduce risk, loss, waste, and expenditures. The key to achieving DFPC's goal is developing the capability to detect fires earlier, locate them faster, provide the local Incident Commander with data needed to make informed decisions regarding suppression strategy, and then dispatch the appropriate aviation suppression resources expeditiously.[339]

Civilian and military aircraft have been utilized in Colorado in the past. However, unlike CAL FIRE, the DFPC did not directly operate aircraft. As directed by legislation, the state of Colorado through its CFAC owns and operates two "multi-mission aircraft"

---

[335] "About Us," accessed August 16, 2015, http://dfpc.state.co.us/alerts/home/contact-us.

[336] Colorado Department of Public Safety, Division of Fire Prevention and Control, *2014 Colorado Firefighting Air Corps Aviation Plan*, 5.

[337] Colorado Department of Public Safety, Division of Fire Prevention and Control, *Special Report: Colorado Firefighting Air Corps, Report to the Governor and General Assembly on Strategies to Enhance the State's Aerial Firefighting Capabilities*, 1.

[338] Colorado Department of Public Safety, Division of Fire Prevention and Control, *2014 Colorado Firefighting Air Corps Aviation Plan*, 6.

[339] Ibid., 5.

(MMA). According to the CFAC, features of the MMA include (1) real time fire intelligence, (2) geospatial product generation, (3) interagency communications, and (4) aerial surveillance.[340] The MMA does not assist aerial firefighting as an air tactical aircraft. For the 2015 fire season, the CFAC contracted three helicopters and two SEATs.

The CFAC's helicopter's and SEAT's primary responsibilities are to drop water or retardant. Helicopter water buckets, depending on the manufacturer, vary in capacity from 50 gallons to over 5,000 gallons. CFAC helicopters can drop from 100 to 300 gallons. According to the NWCG's *Interagency Single Engine Air Tanker Operations Guide*, SEAT airplanes can deploy from 500 to 800 gallons of fire retardant or water and are used primarily for IA.[341] IA occurs as early as possible after detection of the wildfire. The goal of IA is to prevent the fire from growing and suppressing it while it is still as small as possible. The CFAC's contracted helicopters and SEAT capabilities are used to meet the DPFC's goal for wildfire management during IA.

Local governments also maintain their own aircraft, in part to provide aerial wildfire suppression. One prominent example from a wildfire perspective is Los Angeles County in California. The Los Angeles County Fire Department (LACFD) owns and operates nine helicopters. In addition, LACFD contracts with privately owned companies for both air tankers and additional helicopters with greater capabilities than the helicopters that they operate.[342] Otherwise, the LACFD's program for aerial firefighting is similar to all other wildland firefighting missions involving aircraft as described previously.

## C. AIRCRAFT KIND AND TYPE

Aircraft used to suppress wildfires are identified by "kind" (fixed wing or rotor wing) and "type" (capability). Air tankers (fixed wing) are identified by the following capabilities: a Type I air tanker is capable of dropping a minimum of 3,000 gallons of

340 "Multi-Mission Aircraft," accessed August 23, 2015, http://dfs.state.co.us/programs-2/mma.

341 National Wildfire Coordinating Group, *Interagency Single Engine Air Tanker Operations Guide* (PMS 506, NFES 001844) (Boise, ID: National Wildfire Coordinating Group, 2014), 28.

342 "Air Operations," Los Angeles County Fire Department (Power Point), accessed August 22, 2015, http://www.ntsb.gov/news/events/Documents/public_aircraft-Panel_4_Short.pdf.

water or fire retardant, a Type II air tanker carries from 1,800 to 2,999 gallons of water or fire retardant, and a Type III air tanker has the capacity to carry from 800 to 1,799 gallons of water or fire retardant.[343] SEATs (Type IV) carry a maximum of 800 gallons of water or retardant.[344] A special category of air tankers are called "Very Large Air Tankers" (VLAT). DC-10 aircraft carry 11,900 gallons of water or retardant while 747 aircraft carry 19,600 gallons of water or retardant.[345] DOD C-130 Hercules aircraft equipped with MAFFS carry 3,000 gallons of water or retardant and are classified as Type I air tankers.[346]

Helicopters are also classified by their fire suppression capability, among other factors. Type I helicopters are considered "heavy" helicopters and must be able to carry a minimum of 700 gallons of water or retardant.[347] Type II helicopters are known as "medium" helicopters. A Type II helicopter must be capable of carrying a minimum of 300 gallons of water or retardant.[348] "Light" helicopters must be able to carry a minimum of 100 gallons or water or retardant and are known as Type III helicopters.[349] Helicopters that have fixed tanks for water or retardant are known as "helitankers."[350] As noted previously, helicopters also drop water from buckets, both rigid buckets and collapsible buckets. Collapsible buckets carry from approximately 90 to 2,000 gallons of water while rigid buckets are capable of delivering 100 to 3,000 gallons of water.[351]

## D. AIRCRAFT SAFETY

Coordinating the use of both civilian and military aircraft is important to complete the wildfire suppression mission safely. Having both military and civilian aircraft in the

---

343 National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide*, 59–62.

344 Ibid.

345 Ibid.

346 Ibid.

347 National Wildfire Coordinating Group, *Interagency Helicopter Operations Guide* (NFES 001885, PMS 510) (Boise, ID: National Wildfire Coordinating Group, 2013), GL–16.

348 Ibid., GL–22.

349 Ibid., GL–20.

350 Ibid., 63.

351 National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide*, 63.

same airspace is a challenge for the pilots flying in very dangerous conditions. One concern is that civilian and military aircraft generally operate on different radio frequencies. After the Waldo Canyon Fire in Colorado during 2012, the Incident Management Team's (IMT) narrative summary closeout regarding air operations states:

> The primary Operational issue was incorporating the Military Aircraft into our Air Operation. At one point we were conferring with Air National Guard, Regular Army, and National Guard. Through a series of discussions involving Air Operations and Military personnel a positive relationship was established letting military aircraft contribute to the suppression effort.[352]

Communication issues are also dangerous for firefighters on the ground, as they require the ability to communicate with all aircraft. In addition to communication concerns, it is essential that airspace coordination be carefully managed to maintain safe operations.

Airspace coordination and flight de-confliction is prescribed by the procedures established in the "Interagency Airspace Guidelines"[353] through guidance from the Federal Aviation Administration's (FAA) National Airspace System (NAS)[354] and *Airspace Management Plan for Disasters*.[355] The NAS was developed to "Protect persons and property on the ground, and to establish a safe and efficient airspace environment for civil, commercial, and military aviation."[356] The *Airspace Management Plan for Disasters* directs the use of "fire traffic areas" (FTA) and "temporary flight restrictions" (TFR) specifically for wildfire events.[357] These directions provide flight following and other safety requirements as specified in NWCG documents, such as the

---

[352] National Incident Management Team, Great Basin Team 2, Rich Harvey, Incident Commander, *Waldo Canyon Fire Narrative Summary*. NOTE: This document is from the author's private collection.

[353] "Airspace Guide," accessed August 25, 2015, http://airspacecoordination.org/guide/index.html.

[354] "Appendix A: National Airspace System Overview," accessed August 29, 2015, https://www.faa.gov/air_traffic/nas_redesign/regional_guidance/eastern_reg/nynjphl_redesign/documentation/feis/appendix/media/Appendix_A-National_Airspace_System_Overview.pdf.

[355] Federal Aviation Administration, *Airspace Management Plan for Disasters*.

[356] "Appendix A: National Airspace System Overview," A–1.

[357] Federal Aviation Administration, *Airspace Management Plan for Disasters*, 5.

*National Interagency Mobilization Guide*[358] and the *Interagency Standards for Fire and Fire Aviation Operations* support aircraft safety.[359]

## E. AIRCRAFT SUPPORT FOR FIRE SUPPRESSION

Other federal entities are involved in the use of aircraft for suppression of wildfires. These entities do not use or provide aircraft directly, but support the use of aircraft in the suppression of wildfires throughout the United States: NWCG, the NIFC, and the NICC.

The NWCG is located in Boise, Idaho. Formed by the USDA and the DOI in 1976, the mission of the NWCG states:

> The National Wildfire Coordinating Group provides national leadership to develop, maintain, and communicate interagency standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities. Although NWCG standards are interagency by design, the decision to adopt and utilize them is made independently by the individual member entities and communicated through their respective directives systems.[360]

Currently, nine member agencies make up the NWCG.[361]

The NIFC is another federal agency partnership located in Boise, Idaho. The NIFC also comprises nine federal agencies and organizations.[362] The NIFC's mission is to serve as "The nation's support center for wildland firefighting." Originally established in 1965 as the Boise Interagency Fire Center (BIFC) by the USFS, the BLM, and the National Weather Service (NWS), those agencies "Saw the need to work together to reduce the duplication of services, cut costs, and coordinate national fire planning and

---

[358] National Interagency Fire Center, *National Interagency Mobilization Guide*.

[359] National Interagency Fire Center, *Interagency Standards for Fire and Fire Aviation Operations*.

[360] "Mission."

[361] The nine member agencies of the NWCG are (alphabetically) the Bureau of Indian Affairs, the Bureau of Land Management, the Fish and Wildlife Service, the Forest Service, the International Association of Fire Chiefs, the Intertribal Timber Council, the National Association of State Foresters, the National Park Service, and the United States Fire Administration.

[362] The nine agencies/organizations of the NIFC include the Bureau of Land Management, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, the National Park Service, the Unites States Forest Service, the National Oceanic and Atmospheric Administration, the National Business Center, the United States Fire Administration, and the National Association of State Foresters.

operations." In 1993, having added additional agencies and organizations, the BIFC changed its name to the NIFC "To more accurately reflect its national mission."[363]

The NIFC also assists in the coordination of aircraft for wildfire suppression. The NIFC's roles include support for contracting aircraft for wildfire suppression (contract types include both "call when needed" (CWN) and "exclusive use" arrangements); testing and qualifying helicopter pilots; and supporting various committees regarding the use of aircraft in wildfire. Like the NWCG, the NIFC does not own or operate aircraft for fire suppression during wildfires. The NIFC provides support functions to those federal (non-DOD) agencies that do operate aircraft.[364]

The NICC is another partnership-based federal agency co-located in Boise, Idaho with the NIFC. The NICC is an operational unit of the NIFC. The NICC's mission is to serve as "The focal point for overseeing all interagency coordination activities throughout the United States." The NICC website also states:

> Wildfire suppression is built on a three-tiered system of support-the local area, one of the 11 geographic areas, and finally, the national level. When a fire is reported, the local agency and its firefighting partners respond. If the fire continues to grow, the agency can ask for help from its geographic area. When a geographic area has exhausted all its resources, it can turn to NICC at the National Interagency Fire Center (NIFC) for help in locating what is needed, from air tankers to radios to firefighting crews to incident management teams.[365]

The NICC plays an important role in supporting the deployment of aircraft, whether civilian or military, to wildfire incidents throughout the United States. Regarding military support for wildfire specifically, a DOD liaison officer (LOFR) is assigned to the NICC during the fire season. The LOFR is generally assigned from June through October every year, although the timeframe varies depending on the severity and length of the wildfire season. The position is formally known as the "Military LOFR" at the NICC.[366]

---

[363] "About NIFC," accessed August 13, 2015, https://www.nifc.gov/aboutNIFC/about_mission.html.

[364] "Aviation," accessed August 13, 2015, https://www.nifc.gov/aviation/aviation_main.html.

[365] "About Us," National Interagency Coordination Center.

[366] O'Brien, FEMA Region 10 Defense Coordinating Element staff member.

Training and establishing guidelines for the use of aircraft in the wildfire environment is one task performed by federal agencies, such as the NWCG. Among approximately two dozen that are available, examples of guides and standards promulgated by the NWCG include the *National Fire Danger Rating System* (NFDRS), the *Fireline Handbook*, and the *National Interagency Mobilization Guide*.[367] Further, the NWCG provides standardized training curricula for such things as dispatching, fire prevention, leadership, and fire suppression. The *2015 NWCG Publications Catalog* currently lists approximately 64 individual training classes. More classes are available but not listed in the catalog.[368]

The NWCG has also developed multiple training courses specifically related to aviation. Aviation-based courses include:

- Aircraft Dispatcher (D-312)
- Basic Air Operations (S-270)
- Helicopter Crewmember (S-271)
- Single Engine Air Tanker Manager (S-273)
- Helicopter Management (S-372)
- Air Support Group Supervisor (S-375)
- Aerial Supervision (S-378)[369]

Most NWCG courses refer to air operations, ensuring that all personnel have an awareness and understanding of the use of aircraft, whether civilian or military, for fire suppression.

The NWCG's primary manual, commonly known throughout the wildfire community as the "Red Book," is officially titled the *Interagency Standards for Fire and Fire Aviation Operations*. As indicated in its title, the "Red Book" has one chapter fully

---

[367] National Wildfire Coordinating Group, *NWCG National Fire Equipment System, Catalog Part 2: Publications 2015* (PMS 449–2) (Boise, ID: National Wildfire Coordinating Group, 2015), 2–3.

[368] Ibid.

[369] National Wildfire Coordinating Group, *NWCG National Fire Equipment System, Catalog Part 2: Publications 2015*, 1–2.

devoted to the use of aircraft during wildfires. Chapter 16 is titled "Aviation Operations and Resources."[370]

The NWCG also develops many other standards, guides, and directories regarding the use of aircraft in fire suppression. Wildfire suppression aviation standards and other documents include:

- Five Steps to a Safe Flight
- Interagency Aerial Supervision Guide (IASG)
- Interagency Airtanker Base Directory
- Interagency Airtanker Base Operations Guide
- Interagency Aviation Mishap Response Guide and Checklist
- Interagency Aviation User Pocket Guide
- Interagency Helicopter Operations Guide (IHOG)
- Interagency Single Engine Airtanker Operations Guide (ISOG)
- Twelve Standard Aviation Questions that Shout "Watch Out"![371]

The *Incident Response Pocket Guide* (IRPG), used by almost all wildland firefighters in the United States, devotes 20 pages (of an approximately 120-page guide) to aviation references.[372] The NWCG and other federal agencies are intimately involved with the use of aircraft for wildfire suppression.

[370] National Interagency Fire Center, *Interagency Standards for Fire and Fire Aviation Operations*.

[371] National Wildfire Coordinating Group, *NWCG National Fire Equipment System, Catalog Part 2: Publications 2015*, 2–3.

[372] National Wildfire Coordinating Group, *Incident Response Pocket Guide* (PMS 461/NFES 00107) (Boise, ID: National Wildfire Coordinating Group, 2014), 43–62.

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX B. CANADA AND AUSTRALIA

Like the United States, and indeed, most democratic states, Canada and Australia employ military resources within their borders under certain circumstances, usually in the context of natural disasters and other emergencies that exceed the ability of the sub-national governments and their resources to respond safely, effectively, and efficiently. Canada and Australia also have a similar version of the U.S. IRA. However, Canada and Australia do not utilize military aircraft for wildfire suppression. The United States should consider the Canadian and Australian model for whether or not military aircraft should be used to assist in wildfire suppression. This appendix reviews the use of aircraft, both civilian and military, during wildfires in Canada and Australia. Based on a comparison of the policies and practices in those countries, the United Statesmay benefit from their experiences regarding the use of military aircraft to suppress wildfires.

## A. CANADA AND AUSTRALIA

The Canadians and the Australians employ their respective militaries within their borders in response to natural disasters, among other purposes. Both the Canadian Armed Forces (CAF) and the Australian Defence Forces (ADF) have provisions similar to the United Statesfor immediate response. In addition, both the CAF and the ADF deploy their assets during large-scale wildfires. What can the United Stateslearn and apply in its use of military assets, including aircraft, during civilian wildfires?

### 1. Canada

Approximately 42 percent of Canada, or 348 million hectares (860 million acres), is covered by forested lands.[373] This sum represents about 4.17 million square kilometers[374] and is reported to be approximately 10 percent of the world's forests.[375] Like its neighbor to the south, Canada suppresses numerous wildfires throughout the

[373] "Forests," accessed March 25, 2015, https://www.nrcan.gc.ca/forests.

[374] Blair Watson, "Fighting Wildfires," *Frontline Security* 6, no. 2 (Summer 2011): 32.

[375] "Fire," accessed January 14, 2015, https://www.nrcan.gc.ca/forests/fire/13143.

country every year. Natural Resources Canada (NRC) reports that over the past 25 years, Canada has experienced some 8,300 wildfires resulting in approximately 2.3 million hectares (5,681,000 million acres) burned.[376] During the last 10 years, Canada has spent from $500 million to $1 billion per year to suppress wildfires.[377]

The Canadians also utilize aircraft in the suppression of wildfires. Blaire Watson reports that more than 100 aircraft are used for fighting wildfires in Canada.[378] Canada's aircraft inventory includes both fixed wing tankers and helicopters. Aircraft for fighting wildfire are owned and deployed by provincial governments, as well as contracted for wildfire suppression from private owners.[379] This arrangement represents a mix of firefighting aircraft from public, private, and public-private partnerships.[380] Canada also reports that its fleet of aircraft is aging with approximately 83 percent greater than 30 years old while 25 percent are more than 40 years old.[381]

The Canadian Interagency Forest Fire Centre (CIFFC) coordinates wildfire suppression in Canada. The CIFFC helps to coordinate the use of aircraft during wildfire suppression via the Aviation Working Group (AWG). The AWG provides a variety of services to the wildfire aviation community. Their goals include safety, regulations, training, hiring procedures and standards, operational guidelines, and research and development.[382] The vision of the CIFFC AWG is "A seamless exchange of fire aviation assets across national and international boundaries."[383]

---

376 "Fire."

377 Ibid.

378 Watson, "Fighting Wildfires," 33.

379 Ibid.

380 P. Fuglem and K. G. Hirsch, *Canadian Wildland Fire Strategy: Background Syntheses, Analyses, and Perspectives* (Edmonton, AB: Canadian Council of Forest Ministers, 2006), 14.

381 Ibid., 61.

382 "Aviation Working Group," accessed May 30, 2015, http://www.ciffc.ca/index.php?option=com_content&task=view&id=23&Itemid=47.

383 Ibid. The United Statesuses as its guidance for international coordination the *Interagency Standards for Fire and Fire Aviation Operations* published by the USDA and the U.S. DOI. Chapter 8 ("Interagency Coordination and Cooperation") specifically addresses sharing wildfire resources, including aviation equipment, with Mexico, Canada, Australia, and New Zealand.

The CAF includes the Canadian Army, the Royal Canadian Navy (RCN), and the Royal Canadian Air Force (RCAF).[384] Similar to the United States, the CAF also provides support to civilian missions. The authority for CAF support to civilian authorities is the Emergencies Act of 1988, which provides four categories under which the military may deploy domestically. The first category is for a "public welfare emergency," which "Involves military support to civil authorities coping with a natural disaster."[385] Military missions in Canada to support civilians are organized under Contingency Plan LENTUS.[386] When activated, "Operation LENTUS is the CAF contingency plan that outlines the joint response to provide support for Humanitarian Assistance and Disaster Response (HADR) to provincial and territorial authorities in the case of a major natural disaster that overwhelms their capacity to respond."[387] Forest fires are specifically referenced in Operation LENTUS guidance. The Canadian Joint Operations Command (CJOC) manages military operations in the civilian environment.

When a province is overwhelmed by a natural disaster, including wildfires, the provincial government makes a request for CAF support to the federal government. The request is then routed to the Minister of National Defence. The Minister then sends the request to the Chief of Defence Staff who assigns the request to the CJOC. Similar to the United States, when the situation is imminent, a local CAF commander can respond to the incident prior to approval through the formal chain of command. Known as a "Rapid Response Operation" (RRO), it may be utilized to "Save lives or alleviate human suffering "[388] In the United States, a local commander has "Immediate Response

384 "Frequently Asked Questions," accessed January 16, 2015, http://www.forces.gc.ca/en/about/faq.page.

385 Nadav Morag, *Comparative Homeland Security: Global Lessons* (Hoboken, NJ: John Wiley and Sons, Incorporated, 2011), 211.

386 "The Force of Last Resort: How the CAF Respond to Natural Disasters across Canada," June 23, 2014, http://www.forces.gc.ca/en/news/article.page?doc=the-force-of-last-resort-how-the-caf-respond-to-natural-disasters-across-canada/hwriv2eb.

387 "Operation LENTUS," November 21, 2014, http://www.forces.gc.ca/en/operations-canada-north-america/op-lentus.page.

388 "The Force of Last Resort: How the CAF Respond to Natural Disasters across Canada."

Authority" (IRA) to "Save lives, prevent human suffering, or mitigate great property damage."[389]

The Canadian Army, the RCN, and the RCAF are all participants when called on to support other Canadian governments during civilian emergencies. The last mission provided to civilians by the CAF due to wildfire was in July 2011 when northwestern Ontario residents were evacuated by military aircraft due to the threat from forest fires. Known as Operation FORGE, six C-130 aircraft flew 42 missions to evacuate 3,614 persons.[390] The CAF, however, does not utilize aircraft in the direct suppression of wildfires. The only support that CAF aircraft provide to civilian authorities is for evacuation of persons in danger from wildfires, to transport firefighters to fire locations, and to provide situational awareness.

Unlike the United States, then, Canada does not utilize CAF aircraft for the direct suppression of wildfires. The use of military aircraft during civilian wildfires in Canada is limited to support activities only, such as the transportation of people and supplies.

### 2. Australia

Australia is covered by 125 million hectares (approximately 309 million acres) of forest, which accounts for 16 percent of Australian land and three percent of the world's forests.[391] Similar to the United States and Canada, Australia also routinely experiences wildfiresa. Known as "bushfires" in Australia, the Australian Department of Agriculture reports in its *2013 State of the Forests* report that from 2006 to 2011, approximately 31.6 million hectares experienced unplanned fires.[392] To help fight these fires, aircraft are also used in Australia to combat bushfires.

---

[389] United States Department of Defense, *DCSA Handbook: Tactical Level Commander and Staff Tool Kit*, 3–4.

[390] "Operation LENTUS," Operation FORGE.

[391] "Australia's Forests," accessed May 31, 2015, http://www.agriculture.gov.au/abares/forestsaustralia/australias-forests.

[392] Australian Government Department of Agriculture, *Australia's State of the Forests Report 2013 Executive Summary* (Canberra, ACT: Australian Government Department of Agriculture, 2013), 2.

In Australia, the National Aerial Firefighting Centre (NAFC) organizes the country's efforts concerning aircraft and bushfire suppression. Their mission statement states, "NAFC provides national collaboration and cooperation; developing excellence and a safe, effective and efficient aerial capability; supporting and enhancing the delivery of landscape fire management in Australia."[393] The report indicates that Australia's national fleet totals 77 fixed wing and rotor wing aircraft.[394] These aircraft are used to drop water and retardant, provide aerial supervision, and gather intelligence. During the 2013–2014 fire season, aircraft in Australia participated in 3,018 bushfire missions.[395] In addition, the states and territories of Australia also contract with private aircraft for bushfire responsibilities.[396]

The Australian Defence Force (ADF) provides support to civilians. The ADF comprises the Australian Army, the Royal Australian Navy (RAN), and the Royal Australian Air Force (RAAF).[397] However, ADF personnel generally do not receive training for response to bushfires. Specifically, the RAAF reports that in regards to its humanitarian efforts, "The majority of Air Force personnel do not receive specialist fire fighting training and are not trained to fight a bushfire."[398] The last time that the RAAF provided support to civilians for a bushfire was in 2013. In January of that year, supplies, such as generators and transformers, were delivered to Tasmania while in October in New South Wales, the RAAF and the RAN provided refueling assistance to firefighting aircraft, as well as food and accommodations for firefighters.[399]

---

393 National Aerial Firefighting Centre, *2014 Annual Report* (East Melbourne, VIC: National Aerial Firefighting Centre, 2015), 2.

394 Ibid., 4.

395 Ibid.

396 Bushfire Coordinating Committee, *Policy 1/2005 Aviation Support to Bush Firefighting* (New South Wales, AU: New South Wales Rural Fire Service, March 30, 2005), 1–2.

397 "Home," accessed May 31, 2015, http://www.defence.gov.au/.

398 "Humanitarian Support."

399 "Recent History of Air Force Humanitarian Assistance," accessed May 31, 2015, http://www.airforce.gov.au/Operations/Humanitarian-support/Recent-history-of-Air-Force-humanitarian-assistance/?RAAF-6MEVbT/rUtnAoN5eTB6bAKXUVFHmczIl; "Defence Assistance amid Bushfires," January 9, 2013, http://www.navy.gov.au/news/defence-assistance-amid-bushfires.

Legal authority for the ADF to act within their country comes from two laws. The first is Defence Aid to the Civil Community (DACC) and the second is Defence Force Aid to the Civil Authorities (DFACA). DACC is used during civil emergencies, such as natural disasters or when the use of force is not anticipated. On the other hand, Michael Eburn, an associate professor at the Australian National University, states, "DFACA is used where it is anticipated that the DF may use force."[400] DACC, then, is the primary authority by which the ADF support citizens during disasters.

The DACC is comprised of six categories by which the ADF may provide emergency support. The first three categories are applicable to bushfire disasters, among other situations. The first three categories of the DACC state:

> *DACC Category 1* is emergency assistance for a specific task(s) provided by Local Commanders/Administrators, from within their own resources, in localised emergency situations when immediate action is necessary to save human life, alleviate suffering, prevent extensive loss of animal life, or prevent widespread loss/damage to property. Provision of DACC Category 1 assistance should not normally exceed 24 hours.
>
> *DACC Category 2* is emergency assistance, beyond that provided under Category 1, in a more extensive or continuing disaster where action is necessary to save human life or alleviate suffering, prevent extensive loss of animal life, or prevent loss/damage to property, and when State/Territory resources are inadequate.
>
> *DACC Category 3* is assistance associated with recovery from a civil emergency or disaster, which is not directly related to the saving of life or property.[401]

Categories 4, 5, and 6 of the DACC are applicable to non-emergency situations. ADF response to civilian emergencies is coordinated through the Joint Operations Support Staff (JOSS) and the Military Strategic Commitments (MSC).

---

[400] "The Australian Defence Force-Defence Aid to the Civil Community (DACC) and Defence Force Aid to the Civil Authorities (DFACA)," October 21, 2013, https://emergencylaw.wordpress.com/2013/10/21/the-australian-defence-force-defence-aid-to-the-civil-community-dacc-and-defence-force-aid-to-the-civil-authorities-dfaca/.

[401] Australian Government Department of Defence, *Defense Instructions General* (WIT.6002.001.0011) (Canberra, ACT: Department of Defence, 2004), 3.

The ADF works to manage citizen expectations concerning bushfires, and whether Defence personnel will be fighting the fires. ADF personnel are not directly involved as firefighters during bushfires. An Australian National Audit Office report states, "In fact, the most common and effective use of Defence resources during a bushfire is in a support role, providing refueling of commercial and civilian aircraft, transporting equipment and personnel, and providing base services."[402]

Like Canada, Australia does not utilize military aircraft for bushfire suppression missions using water or fire suppression retardant. ADF aircraft are only used in support roles, such as transporting firefighters and equipment, evacuating citizens, and other similar roles.

## B. COMPARATIVE ANALYSIS WITH U.S. POLICY

The U.S. DOD utilizes its personnel, tools, and equipment to support civilians during natural disasters and other emergencies. Like most western nations, Canada and Australia also use their respective militaries during civilian crises. The United States can learn from Canadian and Australian practices, specifically in the area of deploying military aircraft to civilian wildfires.

### 1. Resource Use

The U.S. wildfire suppression aircraft system is overseen by the NICC in Boise, Idaho.[403] The NICC is supplemented by many regional dispatch centers, but its task is difficult with many resources and a large geographic area to manage. Also, state and local dispatch centers may directly request aircraft for wildfire suppression. In addition, the large numbers of both civilian and military aircraft dispersed throughout the country, which are owned and/or operated by a variety of agencies, make the coordinated use of wildfire suppression aircraft complicated. When compared to the system of aircraft management during wildfires in both Canada and Australia, which each has one national agency that manages the use of all aircraft during wildfires, the U.S. system appears to be

[402] Australian National Audit Office, *Emergency Defence Assistance to the Civil Community Audit Report No. 24 2013–2014* (Barton, ACT: Australian National Audit Office, 2014), 39.

[403] "Aviation," accessed May 31, 2015, http://www.nifc.gov/nicc/logistics/aviation/aviation.htm.

handcuffed by the number of aircraft, the number of resource-sharing agreements, and the decentralized system employed throughout the states individually and nationally. Although the creation of a similar system is not restricted by any legal barriers, it would be difficult for the United States to emulate the current national systems of either Canada or Australia.

Another difficulty for the United States in instituting a similar system to Canada or Australia is institutional. The current system has been in place for many, many years. Further, the culture of independence in the United States limits the willingness of local and state governments to give up control of emergency response in their jurisdictions to a system of management that shares resources on a national level.

The wide variety of agreements in place for the use of wildfire aircraft also contributes to difficulty in the U.S. agreements between private agencies, governmental entities, and private and public agencies are all commonplace in the United States. Both civilian and DOD aircraft are included in these many agreements, which creates inefficiency, confusion, and potentially competing interests. The competition for and between aircraft may be the primary struggle between the U.S. system and the Canadian and Australian systems of wildfire aircraft management.

In Canada, the use of aircraft for fire suppression is coordinated by the CIFFC. Canada has developed one national agreement for the sharing and management of resources, including aircraft. The agreement was developed in 1982 and is known as the Mutual Aid Resource Sharing (MARS) agreement.[404] Regarding the MARS program provided by the CIFFC, Larson, Tsang, and McAlpine reported, "Interagency resource-sharing would not work on the national level without CIFFC since the overhead of calling and coordinating with all provinces would be too much for individual agencies to bear."[405] The MARS agreement specifically addresses the sharing of aircraft and includes private aircraft contracted for wildfire suppression. One limitation to the MARS,

[404] Kate Larson, Rob McAlpine, and Alan Tsang, *Sharing of Firefighting Resources*, Technical Report CS2012-11 (Waterloo, ON: University of Waterloo, 2012), 1.

[405] Ibid., 9.

however, is that it does not coordinate helicopters for wildfire suppression. Helicopters are shared throughout the provinces.[406]

Australia also coordinates its firefighting aircraft via one central agency. The NAFC, through its Resource Management Agreement (RMA), provides for the oversight and coordination of wildfire suppression aircraft. In addition, the NAFC has recently implemented a service known as ARENA. ARENA is a national information system to support fire and emergency aviation activities.[407] The NAFC also includes contracted aircraft within its resource coordination.

While possible, it is unlikely that the United States could overcome the current system of independent agreements, management, and control to develop a system such as Canada's MARS or Australia's RMA to coordinate the use of aircraft during wildfires. Too many resources and existing agreements may exist to manage air tankers and helicopters across the vast geography of the United States . Establishing a more effective national coordination of aircraft resources for wildfires suppression may be a topic for future research.

### 2. Civil-Military Interface

The United States, Canada, and Australia all deploy military assets within their borders and is referred to as the "civil-military interface." All three countries implement response to disasters, including wildfires, within similar authorities. As noted by Morag, although, "Unlike the United States (with the restrictions on the domestic use of the military through *posse comitatus* and other legislation), most democratic countries have far less reluctance regarding employing the military domestically."[408] Two aspects of civil-military interface are compared.

First, the U.S. DOD, under the IRA, permits individual installation leadership to deploy assets under their direction to impact three conditions. These conditions are, "To

---

[406] Marc Mousseau (CIFFC), email message to the author, August 5, 2015.

[407] National Aerial Firefighting Centre, *2014 Annual Report*, 12.

[408] Morag, *Comparative Homeland Security: Global Lessons*, 207.

save lives, prevent human suffering, or mitigate great property damage."[409] The CAF implements RRO only for the purpose of saving lives and alleviating human suffering. The ADF, via DACC Category 1, responds to disasters when immediate action is necessary, "To save human life, alleviate suffering, prevent extensive loss of animal life, or prevent widespread loss/damage to property."[410] See Table 1.

Table 1. Civil-Military Interface, Immediate Response Comparison

| **United States** | **Canada** | **Australia** |
|---|---|---|
| *Immediate Response Authority* | *Rapid Response Operation* | *Defence Aide to the Civil Community, Category 1* |
| Save lives | Save lives | Save human life |
| Prevent human suffering | Alleviate human suffering | Alleviate suffering |
| Mitigate great property damage | | Prevent extensive loss of animal life |
| | | Prevent widespread loss/damage to property |

In the example shown in Table 1, the United States seems to have developed a good balance of civil-military interface for responding to civilian emergencies when compared to Canada and Australia. The U.S. DOD may desire to decrease its domestic obligations and drop the IRA provision to "mitigate great property damage." On the other hand, the U.S. DOD may want to increase its responsibilities to "prevent extensive loss of animal life." The doctrine that guides the IRA would have to be amended to implement either case. No known legal barriers are evident if either change were to be enacted. The primary drivers for the U.S. DOD changing its IRA policy would likely be fiscal and mission readiness.

Second, the U.S. DOD has prepared military aircraft for wildfire suppression activities including both rotor wing aircraft (helicopters) and fixed wing aircraft (air tankers). Helicopters have a cable with a bucket that carry and drop 660 gallons of water

409 United States Department of Defense, *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit*, 3–3.

410 Australian Government Department of Defence, *Defense Instructions General*, 3.

or 2,000 gallons of water depending on the aircraft.[411] Air tankers use MAFFS to drop up to 3,000 gallons of water or fire retardant.[412] MAFFS capabilities are similar to USFS or contract aircraft, although VLATs such as a DC-10 can disperse up to 11,600 gallons of water or fire retardant.[413] The CAF and the ADF, however, do not use military aircraft to drop water or fire retardant during wildfires. Both the Canadians and the Australians use their military aircraft exclusively in support roles, such as the transportation of equipment and personnel.

The U.S. DOD, then, may consider abandoning the current practice of modifying aircraft to perform suppression duties during civilian wildfires. Implementing this decision would amend the existing institutional and historical practice of the DOD. Like the decision to modify the IRA, eliminating aircraft suppression capabilities would require policy change but would not have legal implications. Among the benefits to this decision is less national confusion in where and when military aircraft could be deployed to civilian emergencies and cost savings for the military due to a smaller mission set. One downside would be fewer air assets available nationally to control wildfires.

## C. RECOMMENDATIONS

The United States, Canada, and Australia all deploy aircraft in response to wildfire. The Canadians and Australians use one primary national resource-sharing system for deploying their aircraft. In addition, although all three countries utilize their military assets within their respective borders, differences occur in how and when the military assets are deployed. Finally, Canada and Australia differ in their use of military aircraft for civilian wildfire situations, specifically, Canada and Australia do not use military aircraft for dropping water, foam, or fire retardant. Based on the policies and practices of Canada and Australia, the United States should consider the following recommendations for responding aircraft to wildfires:

---

411 "The Use of Military Helos on WUI Fires," May 27, 2013, http://www.firefighternation.com/article/wildland-urban-interface/use-military-helos-wui-fires. UH-60 Blackhawk helicopters use buckets that carry 660 gallons of water. CH-47 Chinook helicopters use buckets that carry 2,000 gallons of water.

412 National Wildfire Coordinating Group, *Interagency Aerial Supervision Guide*, 68.

413 "The Plane," accessed May 31, 2015, http://www.10tanker.com/the-plane.html.

- The United States should develop a single aircraft resource-sharing plan for wildfire suppression similar to Canada's MARS and Australia's RMA.
- The United States should maintain its IRA in its current format. Expanding to include animals similar to Australia's DACC Category 1 may add to an already taxed responsibility.
- The United States should reconsider its use of military aircraft for dropping water or fire retardant to suppress civilian wildfires, and possibly limiting aircraft actions to safer and less controversial support roles.

### 1. Recommendation #1

The need for a comprehensive plan in the United States has been previously identified. In 2006, an interagency working group developed a national strategy for wildfire aviation.[414] However, the plan did not provide specific recommendations for resource sharing. The Emergency Management Assistance Compact (EMAC) is a state-to-state resource-sharing plan already in existence. The EMAC may be a model for the development of a national system for sharing aircraft used in the suppression of wildfire.[415] Recommendation #1 is that the United States research, identify, and design a single national system for the use and sharing of wildfire suppression aircraft similar to those currently in use in both Canada and Australia.

### 2. Recommendation #2

The U.S. DOD, like the CAF and the ADF, already has an existing plan for deploying military resources to disasters within the United States. Each of the three countries has identified conditions by which military resources may be utilized. The United States has three principles (briefly,-lives, suffering, property) while Canada has two principles (lives and suffering) and Australia has four principles (lives, suffering, animals, property). The U.S. plan appears to strike a moderate balance between the other two countries. While Canada does not deploy the military domestically to save property,

[414] National Association of State Foresters, United States Forest Service, United States Department of the Interior, *Comprehensive National Strategy for Use of Aviation Resources in Wildland Fire Management* (Boise, ID: United States Forest Service, 2006), 15.

[415] "Emergency Management Assistance Compact Overview for National Response Framework," accessed September 16, 2015, http://www.fema.gov/pdf/emergency/nrf/EMACoverviewForNRF.pdf.

as the United States and Australia do; Australia also utilizes military resources to care for animals, which the United States and Canada do not.

It is not known if a demand for the U.S. DOD to respond to incidents exists, specifically involving animals at risk. From a wildfire-specific perspective, both domesticated farm animals and wildlife are killed by wildfires. The number of animals, domestic or wild, that die as a result of wildfires is unknown. The USNORTHCOM is responsible for defending the homeland. Their mission indicates that its priorities include civil support and protecting U.S. interests.[416] Some citizens would likely view expanding USNORTHCOM's mission to include care of animals favorably. However, given that the U.S. DOD's homeland mission is already extensive, it is not recommended that its mission be expanded specifically for the protection of animals.

### 3. Recommendation #3

The U.S. DOD deploys aircraft for a variety of missions to civilian emergencies, including wildfires. Both fixed wing air tankers and helicopters are used for a variety of assignments, such as transport of firefighters and equipment, fire suppression, surveillance, and many others. However, military aircraft used specifically to suppress wildfire are limited by strict guidelines.

The U.S. DOD should consider adopting CAF and ADF practices for utilizing aircraft during civilian wildfire emergencies. Military aircraft in both Canada and Australia are used only in support roles, and not for direct firefighting suppression activities. Adopting a support strategy in the United States would decrease conflict regarding the deployment of both civilian and military aircraft. Australia actively educates its citizens regarding military capabilities for wildfire suppression.[417] The United States should do the same if this change were adopted. Considering this change to the existing military mission set would decrease a taxed U.S. military homeland security mission. Although pros and cons can be proferred to utilizing military aircraft in civilian

[416] "USNORTHCOM Mission," May 16, 2013, http://www.northcom.mil/Newsroom/FactSheets/ArticleView/tabid/3999/Article/563996/usnorthcom-vision.aspx.

[417] Australian National Audit Office, *Emergency Defence Assistance to the Civil Community Audit Report No. 24 2013–2014*, 39.

wildfire missions, it is recommended that the U.S. DOD research the use of its aircraft for water and retardant drops and consider limiting its service to civil authorities to support functions only.

# LIST OF REFERENCES


10 Tanker. "The Plane." Accessed May 31, 2015. http://www.10tanker.com/the-plane.html.

American Planning Association. "Hayman Fire: Hayman, Colorado (Case Study)." Accessed August 22, 2015. https://www.planning.org/research/postdisaster/casestudies/haymanfire.htm.

Andrew, Simon A., Jessica E. Short, Kyujin Jung, and Sudha Arlikatti. "Intergovernmental Cooperation in the Provision of Public Safety: Monitoring Mechanisms Embedded in Interlocal Agreements." *Public Administration Review* 75, no. 3 (May/June 2015).

Australian Bureau of Statistics. "Bushfires." March 24, 2006. http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/CCB3F2E90BA779D3CA256DEA00053977?opendocument.

Australian Emergency Law. "The Australian Defence Force-Defence Aid to the Civil Community (DACC) and Defence Force Aid to the Civil Authorities (DFACA)." October 21, 2013. https://emergencylaw.wordpress.com/2013/10/21/the-australian-defence-force-defence-aid-to-the-civil-community-dacc-and-defence-force-aid-to-the-civil-authorities-dfaca/.

Australian Government Department of Agriculture. "Australia's Forests." Accessed May 31, 2015. http://www.agriculture.gov.au/abares/forestsaustralia/australias-forests.

———. *Australia's State of the Forests Report 2013 Executive Summary.* Canberra, ACT: Australian Government Department of Agriculture, 2013.

———. "Forestry." Accessed April 18, 2015. http://www.daff.gov.au/forestry.

Australian Government Department of Defence. *Defense Instructions General* (WIT.6002.001.0011)*.* Canberra, ACT: Department of Defence, 2004.

———. "Home." Accessed May 31, 2015. http://www.defence.gov.au/.

Australian National Audit Office. *Emergency Defence Assistance to the Civil Community Audit Report No. 24 2013–2014*. Barton, ACT: Australian National Audit Office, 2014.

AVID, LLC. *Firefighting Aircraft Study: Final Report* (AG-024B-C-12-0006). Yorktown, VA: AVID, 2013.

Bellavita, Christopher. "Changing Homeland Security: What Is Homeland Security?" *Homeland Security Affairs* 4, no. 2 (June 2008). https://www.hsaj.org/articles/118.

Bracmort, Kelsi. *Wildfire Damages to Homes and Resources: Understanding Causes and Reducing Loses* (CRS Report No. RL34517). Washington, DC: Congressional Research Service, 2013.

Bushfire Coordinating Committee. *Policy 1/2005 Aviation Support to Bush Firefighting*. New South Wales, AU: New South Wales Rural Fire Service, 2005.

California Department of Forestry and Fire Protection. "About CAL FIRE." Accessed August 14, 2015. http://calfire.ca.gov/about/about.php.

———. "Air Program." Accessed August 14, 2015. http://calfire.ca.gov/fire_protection/fire_protection_air_program.php.

———. "Aviation History." Accessed August 14, 2015. http://calfire.ca.gov/about/about.php.

———. "Aviation History, Part 2." Accessed August 14, 2015. http://calfire.ca.gov/about about_aviation_history2.php.

———. "Benefits of Fire." Accessed March 7, 2015. http://www.fire.ca.gov/communications/downloads/fact_sheets/TheBenefitsofFire.pdf.

———. "CAL FIRE At A Glance." December 2014. http://calfire.ca.gov/communications/downloads/fact_sheets/Glance.pdf.

———. "CAL FIRE: What's in a Name?" Accessed July 26, 2015. http://calfire.ca.gov/communications/downloads/fact_sheets/CALFIRE.pdf.

———. "General History, Part 1." Accessed August 14, 2015. http://calfire.ca.gov/about/about_calfire_history.php.

California Smokejumpers. "Development of Forest Service Aviation." Accessed July 26, 2015. http://gacc.nifc.gov/oncc/logistics/crews/smokejumpers/about/fsaviationdevel.html.

———. "Development of Smokejumping." Accessed July 26, 2015. http://gacc.nifc.gov/oncc/logistics/crews/smokejumpers/about/smkjdevel.html.

Canadian Interagency Forest Fire Centre. "Aviation Working Group." Accessed May 30, 2015. http://www.ciffc.ca/index.php?option=com_content&task=view&id=23&Itemid=47.

———. Canadian Interagency Forest Fire Centre. “Fires by Year.” May 14, 2014. http://www.ciffc.ca/images/stories/FiresByYears.GIF.

———. “Welcome to CIFFC.” Accessed May 18, 2015. http://www.ciffc.ca/.

CBS Denver. “Military Considers Joining Fighting Wildfires Sooner.” *CBS Denver*, January 23, 2013. http://denver.cbslocal.com/2013/01/23/military-considers-joining-fighting-wildfires-sooner/.

———. “Military Joins Wildfire Fight Must Faster Than Last Year.” *CBS Denver*, June 12, 2013. http://denver.cbslocal.com/2013/06/12/military-joins-wildfire-fight-much-faster-than-last-year/.

———. “Military Plays Huge Role in Fighting Black Forest Fire.” *CBS Denver*, June 15, 2013. http://denver.cbslocal.com/2013/06/15/military-plays-huge-roll-in-fighting-black-forest-fire/.

City of Colorado Springs. *Waldo Canyon Fire Initial after Action Report.* Colorado Springs, CO: City of Colorado Springs, 2012.

City of Woodland Park. *Waldo Canyon Fire after Action Report.* Woodland Park, CO: City of Woodland Park, 2013.

Colorado Department of Public Safety, Division of Fire Prevention and Control. *2014 Colorado Firefighting Air Corps Aviation Plan.* Lakewood, CO: Colorado Department of Public Safety, Division of Fire Prevention and Control, 2014.

———. *Special Report: Colorado Firefighting Air Corps, Report to the Governor and General Assembly on Strategies to Enhance the State’s Aerial Firefighting Capabilities.* Lakewood, CO: Colorado Department of Public Safety, Division of Fire Prevention and Control, 2014.

Colorado Division of Fire Prevention and Control. “About Us.” Accessed August 16, 2015. http://dfpc.state.co.us/alerts/home/contact-us.

———. “Multi-Mission Aircraft.” Accessed August 23, 2015. http://dfs.state.co.us/programs-2/mma.

Colorado Springs Fire Department. “Wildfire Mitigation.” April 3, 2014. http://csfd.coloradosprings.gov/public-safety/fire/prevention-and-safety/wildfire-mitigation.

Cooper, Michael F. “Implementing an Automatic Aid Agreement between Fire Departments.” Executive Fire Officer Program Applied Research Project, National Fire Academy, 1998.

Corley-Smith, Peter, and David N. Parker. *Helicopters in the High Country: 40 Years of Mountain Flying.* Victoria, British Columbia: Sono Nis Press, 1995.

Crockett, Danielle. "The Insurrection Act and Executive Power to Respond with Force to Natural Disasters." Paper prepared for Law 224.9, Disasters and the Law, *University of California Berkeley School of Law*, Spring 2007.

Denver Post, The. "Colorado's Largest Wildfires (Burn Area)." June 25, 2012. http://www.denverpost.com/ci_20934186/colorados-largest-wildfires-burn-area.

Department of the Air Force. *U.S. Air Force Fact Sheet: Modular Airborne Fire Fighting System (MAFFS).* Colorado Springs, CO: Peterson Air Force Base 302nd Airlift Wing Public Affairs, 2015.

Deputy Secretary of Defense. *Defense Support of Civil Authorities (DSCA).* DOD Directive 3025.18. Washington, DC: Deputy Secretary of Defense, 2010.

*DOD Assets: Request/Approval Process for Military Assets*, PowerPoint, n.d.

Dudley, Michael, and Gregory S. Greenhoe. "Fifty Years of Helicopter Firefighting." *Fire Management Notes* 58, no. 4 (Fall 1998).

eHow. "Intergovernmental Agreement Defined." Accessed September 16, 2015. http://www.ehow.com/facts_5813047_intergovernmental-agreement-defined.html.

El Paso County. *Black Forest Fire After Action Report/Improvement Plan.* Colorado Springs, CO: El Paso County, 2014.

El Paso County Office of Emergency Management, City of Colorado Springs Office of Emergency Management, City of Fountain Police and Fire Departments, Ft Carson Directorate of Plans, Training and Mobilization, Peterson Air Force Base 21 CES/CEX, and the U.S. Air Force Academy 10 ABW/CE. *Pikes Peak Multi Jurisdictional Disaster Management Coordination and Resource Sharing Plan*. Colorado Springs, CO: El Paso County, City of Colorado Springs, City of Fountain, Fort Carson, Peterson Air Force Base, U.S. Air Force Academy, 1996.

Elliott, Dan, and Mead Gruver. "Waldo Canyon Fires 2012: Fatal Crash Grounds Key Part of Firefighting Fleet." *Huff Post Denver*, July 3, 2012. http://www.huffingtonpost.com/2012/07/02/waldo-canyon-fires-2012-f_n_1645060.html.

Elsea, Jennifer K. *The Posse Comitatus Act and Related Matters: A Sketch* (CRS Report No. R42669). Washington, DC: Congressional Research Service, 2012.

Emergency Management Assistance Compact. "EMAC Legislation." Accessed September 16, 2015. http://www.emacweb.org/index.php/learnaboutemac/emac-legislation.

———. “Model Intrastate Mutual Aid Legislation.” Accessed September 16, 2015. http://www.emacweb.org/index.php/mutualaidresources/intrastate-mutual-aid/modellegislation#Intra-Implement.

———. “National Guard.” Accessed September 16, 2015. http://www.emacweb.org/index.php/national-guard.

———. “What is EMAC?” Accessed September 16, 2015. http://www.emacweb.org/index.php/learnaboutemac/what-is-emac.

Environmental Protection Agency. “Forestry—Facts and Figures.” August 13, 2013. http://www.epa.gov/agriculture/forestry.html.

Federal Aviation Administration. *Airspace Management Plan for Disasters.* Washington, DC: Federal Aviation Administration, 2012.

———. “Appendix A: National Airspace System Overview.” Accessed August 29, 2015. https://www.faa.gov/air_traffic/nas_redesign/regional_guidance/eastern_reg/nynjphl_redesign/documentation/feis/appendix/media/Appendix_A-National_Airspace_System_Overview.pdf.

Federal Emergency Management Agency (592). *Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Authorities*. Washington, DC: Federal Emergency Management Agency, 2007.

Federal Emergency Management Agency. “Emergency Management Assistance Compact Overview for National Response Framework.” Accessed September 16, 2015. http://www.fema.gov/pdf/emergency/nrf/EMACoverviewForNRF.pdf.

———. “Region II: Defense Coordinating Officer.” Accessed February 8, 2015. https://www.fema.gov/site-page/region-iii-news/defense-coordinating-officer.

Federal Fire and Aviation Task Group. *Interagency Standards for Fire and Fire Aviation Operations* (NFES 2724). Boise, ID: National Interagency Fire Center, January 2015.

Fennell, Anne-Marie. *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success.* (GAO-13-684). Washington, DC: U.S. Government Accountability Office, 2013.

Firefighter Nation. “The Use of Military Helos on WUI Fires.” May 27, 2013. http://www.firefighternation.com/article/wildland-urban-interface/use-military-helos-wui-fires.

Fleming, Casey J., Emily B. McCarta, and Toddi A. Steelman. “Conflict and Collaboration in Wildfire Management: The Role of Mission Alignment.” *Public Administration Review* 73, no. 3 (May/June 2015).

Fuglem, P., and K. G. Hirsch. *Canadian Wildland Fire Strategy: Background Syntheses, Analyses, and Perspectives*. Edmonton, AB: Canadian Council of Forest Ministers, 2006.

Glickstein, Geoffrey L. "Improving Air Support for Wildfire Management In the United States." Master's thesis, Naval Postgraduate School, 2014.

Gorte, Ross. "The Rising Cost of Wildfire Protection." Bozeman, MT: Headwaters Economics, 2013.

Graham, Russell, ed. *Hayman Fire Case Study* (RMRS-GTR-114). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 2003.

Gretz, Raymond C. "Assessing Automatic Aid as An Emergency Response Model." Master's thesis, Naval Postgraduate School, 2013.

Houseman, Bob, Bruce Palmer, Curtis Heaton, Mark Stiles, Nick Giannettino, and Scott Sugg. *Waldo Canyon Fire Review, Pike and San Isabel National Forests, USDA Forest Service.* Lakewood, CO: United States Forest Service, 2013.

InciWeb. "Current Incidents." Accessed October 6, 2015. http://inciweb.nwcg.gov/.

Ingold, John. "Decade after Hayman Fire, Questions Linger about Fire's Start." *The Denver Post*, June 3, 2012. http://www.denverpost.com/ci_20769983/decade-after-hayman-fire-questions-linger-about-fires.

Interagency Airspace Coordination. "Airspace Guide." Accessed August 25, 2015. http://airspacecoordination.org/guide/index.html.

Keating, Edward G., Andrew R. Morral, Carter C. Price, Dulani Woods, Daniel M. Norton, Christina Panis, Evan Saltzman, and Ricardo Sanchez. *Air Attack against Wildfires: Understanding U.S. Forest Service Requirements for Large Aircraft*. Arlington, VA: RAND Corporation, 2012.

Larson, Eric V., and John E. Peters. *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options*. Santa Monica, CA: RAND Corporation, 2001.

Larson, Kate, Rob McAlpine, and Alan Tsang. *Sharing of Firefighting Resources.* Technical Report (CS2012-11) Waterloo, ON: University of Waterloo, 2012.

Leshinsky, Eric L. "Prepared for Disaster? Improving the Department of Defense's Immediate Response Authority." Master's thesis, Naval Postgraduate School, 2006.

Lindsay, Bruce R. *The Emergency Management Assistance Compact (EMAC): An Overview* (CRS Report No. RL 34585). Washington, DC: Congressional Research Service, 2008).

Los Angeles County Fire Department (Power Point). "Air Operations." Accessed August 22, 2015. http://www.ntsb.gov/news/events/Documents/public_aircraft-Panel_4_Short.pdf.

McCarthy, Francis X. *Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding* (CRS Report No. RL33053). Washington, DC: Congressional Research Service, 2011.

Morag, Nadav. *Comparative Homeland Security: Global Lessons.* Hoboken, NJ: John Wiley and Sons, Incorporated, 2011.

National Aerial Firefighting Centre. "Welcome to the National Aerial Firefighting Centre." Accessed May 18, 2015. http://www.nafc.org.au/portal/.

———. *2014 Annual Report.* East Melbourne, VIC: National Aerial Firefighting Centre, 2015.

National Association of State Foresters, United States Forest Service, and United States Department of the Interior. *Comprehensive National Strategy for Use of Aviation Resources in Wildland Fire Management.* Boise, ID: United States Forest Service, 2006.

National Defence and the Canadian Armed Forces. "Frequently Asked Questions." Accessed January 16, 2015. http://www.forces.gc.ca/en/about/faq.page.

———. "Operation LENTUS." November 21, 2014. http://www.forces.gc.ca/en/operations-canada-north-america/op-lentus.page.

———. "The Force of Last Resort: How the CAF Respond to Natural Disasters across Canada." June 23, 2014. http://www.forces.gc.ca/en/news/article.page?doc=the-force-of-last-resort-how-the-caf-respond-to-natural-disasters-across-canada/hwriv2eb.

National Incident Management Team, Great Basin Team 2, Rich Harvey, Incident Commander. *Waldo Canyon Fire Narrative Summary* (CO-PSF-000636, P2GY3N). Colorado Springs, CO: National Incident Management Team, Great Basin Team 2, 2012.

National Interagency Coordination Center. "About Us." Accessed August 13, 2015. http://www.nifc.gov/nicc/about/about.htm.

———. "Aviation." Accessed May 31, 2015. http://www.nifc.gov/nicc/logistics/aviation/aviation.htm.

National Interagency Fire Center. “2014 DC-10 Bases with 250 Nautical Mile Range.” Accessed May 21, 2014. http://www.nifc.gov/nicc/logistics/aviation/VLAT_Bases.pdf.

———. “2014 MAFFS Bases with 150 Nautical Mile Range.” Accessed April 11, 2014. http://www.nifc.gov/nicc/logistics/aviation/MAFFS_Bases.pdf.

———. “About NIFC.” Accessed August 13, 2015. https://www.nifc.gov/aboutNIFC/about_mission.html.

———. “Aviation.” Accessed August 13, 2015. https://www.nifc.gov/aviation/aviation_main.html.

———. “Fire Information, Military Support in Wildland Fire Suppression.” Accessed August 16, 2015. https://www.nifc.gov/fireInfo/fireInfo_military.html.

———. “History.” Accessed August 30, 2015. https://www.nifc.gov/aboutNIFC/about_mission.html.

———.*Interagency Standards for Fire and Fire Aviation Operations* (NFES 2724). Boise, ID: National Interagency Fire Center, 2015.

———. *Military Use Handbook* (NFES 2175)**.** Boise, ID: National Interagency Fire Center, 2006.

———. *Modular Airborne Firefighting System: FAQ and Fact Sheet.* Boise, ID: National Interagency Fire Center, 2012.

———. “National Geographic Area Coordination Center website Portal.” Accessed October 4, 2015. http://gacc.nifc.gov/.

———. *National Interagency Mobilization Guide* (NFES 2092). Boise, ID: National Interagency Fire Center, 2012.

———. “NIFC Home.” Accessed September 7, 2015. https://www.nifc.gov/.

———. “Total Wildland Fires and Acres 1960–2009.” Accessed May 30, 2015. http://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.

National Smokejumper Training Guide-USFS-2008. “Chapter 1: History of Smokejumping.” Accessed July 26, 2015. http://www.fs.fed.us/fire/aviation/av_library/sj_guide/02_history_of_smokejumping.pdf.

National Wildfire Coordinating Group. *Glossary of Wildland Fire Terminology* (PMS 205). Boise, ID: National Wildfire Coordinating Group, 2014.

———. *Incident Response Pocket Guide* (PMS 461/NFES 00107). Boise, ID: National Wildfire Coordinating Group, 2014.

———. *Interagency Aerial Supervision Guide* (NFES 002544, PMS 505). Boise, ID: National Wildfire Coordinating Group, 2014.

———. *Interagency Helicopter Operations Guide* (NFES 001885, PMS 510). Boise, ID: National Wildfire Coordinating Group, 2013.

———. *Interagency Single Engine Air Tanker Operations Guide* (PMS 506, NFES 001844). Boise, ID: National Wildfire Coordinating Group, 2014.

———. "Members." Accessed August 30, 2015. http://www.nwcg.gov/.

———. "Mission." Accessed August 30, 2015. http://www.nwcg.gov/.

———. *NWCG National Fire Equipment System, Catalog Part 2: Publications 2015* (PMS 449–2). Boise, ID: National Wildfire Coordinating Group, 2015.

Natural Resources Canada. "Fire." Accessed January 14, 2015. https://www.nrcan.gc.ca/forests/fire/13143.

———. "Forests." Accessed March 25, 2015. http://www.nrcan.gc.ca/forests.

Office of Governor Steve Bullock: Newsroom. "Governor Bullock to USDA: Cut Unnecessary Obstacles to Firefighting Efforts." Accessed August 21, 2015. https://governor.mt.gov/Newsroom/ArtMID/28487/ArticleID/1726.

Office of Management and Budget. *A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires.* Washington, DC: Office of Management and Budget, 2004.

Perkins, Lucy. "U.S. Army Soldiers Mobilized to Help Suppress Wildfires for First Time Since 2006." *National Public Radio*. August 17, 2015. http://www.npr.org/sections/thetwo-way/2015/08/17/432622212/u-s-army-soldiers-mobilized-to-help-suppress-wildfires-for-first-time-since-2006.

Perry, Donald G. *Wildland Firefighting: Fire Behavior, Tactics, and Command.* Bellflower, CA: Fire Publications, Incorporated, 1990.

Pickup, Sharon L. *Emergency Management Assistance Compact: Enhancing EMAC's Collaborative and Administrative Capacity Should Improve National Disaster Response*. (GAO-07-854). Washington, DC: U.S. Government Accountability Office, 2007.

Rappold, R. Scott. “10 Years Later: A Timeline of the Hayman Fire.” *The Gazette*, June 1, 2012. http://gazette.com/10-years-later-a-timeline-of-the-hayman-fire/article/139582.

Rice, Doyle. “Wildfires Decimate U.S. Forest Service Budget.” *USA Today*. Accessed August 6, 2015. http://www.usatoday.com/story/news/nation/2015/08/05/fire fighting-costs-soar-blazes-worsen-west/31153701/.

Royal Australian Air Force. “Humanitarian Support.” Accessed May 17, 2015. http://www.airforce.gov.au/Operations/Humanitarian-support/?RAAF-hruuHkflEaNxq4BtnrEKSQz5XM3LaPec.

———. “Recent History of Air Force Humanitarian Assistance.” Accessed May 31, 2015. http://www.airforce.gov.au/Operations/Humanitarian-support/Recent-history-of-Air-Force-humanitarian-assistance/?RAAF-6MEVbT/rUtnAoN5eTB6bAKXUVFHmczIl.

Royal Australian Navy. “Defence Assistance amid Bushfires.” January 9, 2013. http://www.navy.gov.au/news/defence-assistance-amid-bushfires.

Schwartz, John. “As Fires Grow, A New Landscape Appears in the West.” *The New York Times*, September 21, 2015. http://www.nytimes.com/2015/09/22/science/as-fires-grow-a-new-landscape-appears-in-the-west.html?_r=0.

Smith, Barry D. *Fire Bombers in Action.* Osceola, WI: Motorbooks International Publishers and Wholesalers, 1995.

Topik, Christopher. “Wildfires Burn Science Capacity.” *Science* 349, no. 6254 (September 2015).

U.S. Forest Service History. “The Weeks Act.” March 1, 2013. http://www.foresthistory.org/ASPNET/Policy/WeeksAct/index.aspx.

———. “U.S. Forest Service Fire Suppression.” Accessed March 17, 2015. http://www.foresthistory.org/ASPNET/Policy/Fire/Suppression/Suppression.aspx.

U.S. Legal. “Definitions: Automatic Aid Law & Legal Definition.” Accessed September 16, 2015. http://definitions.uslegal.com/a/automatic-aid/.

———. “Definitions: Memoranda of Understanding Law & Legal Definition. Accessed September 16, 2015. http://definitions.uslegal.com/m/memorandum-of-understanding/.

———. “Definitions: Mutual Aid Agreement Law & Legal Definition.” Accessed September 16, 2015. http://definitions.uslegal.com/m/mutual-aid-agreement/.

Under Secretary of Defense (AT&L). *DOD Fire and Emergency Services Program*. DOD Instruction 6055.06. Washington, DC: Under Secretary of Defense (AT&L), December 21, 2006.

Under Secretary of Defense (P). *Defense Support of Civil Authorities (DSCA)*. DOD Directive 3025.18. Washington, DC: Under Secretary of Defense (P), 2012.

———. *The Use of the National Guard for Defense Support of Civil Authorities*. DOD Instruction 3025.22. Washington, DC: Under Secretary of Defense (P), 2013.

United States Air Force 302nd Airlift Wing. "Modular Airborne Firefighting System." December 17, 2012. http://www.302aw.afrc.af.mil/library/factsheets/factsheet.asp?id=4555.

United States Air Force, Air Mobility Command. *United States Air Force Aircraft Accident Investigation Board Report* (C-130H3, T/N 93–1458). Scott Air Force Base, IL: United States Air Force, 2012. http://usaf.aib.law.af.mil/ExecSum2012/C-130H3_Edgemont_SD_1%20Jul%2012.pdf.

United States Department of Agriculture and United States Department of the Interior. *Memorandum, 2015 Direction to Wildland Fire Leadership. Secretary Sally Jewell and Secretary Thomas J. Vilsack to Chief, U.S. Forest Service; Director, Bureau of Land Management; Director, National Park Service; Director, U.S. Fish and Wildfire Service; Director, Bureau of Indian Affairs*, June 4, 2015.

United States Department of Agriculture, United States Forest Service. "MAFFS Q&A." Accessed April 23, 2015. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3836600.pdf.

———. "Our History." Accessed July 26, 2015. http://www.fs.fed.us/learn/our-history.

United States Department of Agriculture. *Comprehensive National Strategy for the Use of Aviation Resources in Wildland Fire Management.* Washington, DC: United States Department of Agriculture, 2006.

United States Department of Defense Inspector General. *DOD Civil Support during the 2007 and 2008 California Wildland Fires.* (D-2010-015). Arlington, VA: Department of Defense Inspection General, 2009.

United States Department of Defense. *Defense Support of Civil Authorities (DSCA) Handbook: Tactical Level Commander and Staff Toolkit.* (GTA 90–01-021). Washington, DC: Department of Defense, 2010.

———. *Department of Defense Directive Number 3025.18.* Washington, DC: Department of Defense, 2010.

United States Department of Homeland Security. *National Response Framework.* Washington, DC: Department of Homeland Security, 2013.

United States Department of Homeland Security; Fire Department of the City of New York; New York State Division of Homeland Security and Emergency Services, Office of Fire Prevention and Control, and Office of Counter Terrorism; New York State Intelligence Center; Los Angeles Fire Department; Los Angeles Joint Regional Intelligence Center; Nevada Threat Analysis Center; Colorado Information Analysis Center; and Northern California Regional Intelligence Center. *Note: Terrorist Interest in Using Fire as a Weapon*. (IA-0140-12). Washington, DC: Department of Homeland Security, 2012.

United States Department of Justice. *Sample Memorandum of Understanding.* Washington, DC: Department of Justice, n.d.

United States Department of the Interior, United States Department of Agriculture, and United States Department of Defense. *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations*. (DOI (BLM-FAD) Agreement No. L10PG00548, USDA (USFS-NIFC) Agreement No.10-IA-11130206-008). Washington, DC: Assistant Secretary of Defense for Homeland Defense & America's Security Affairs, 2010.

———. *Modification No. 01: Interagency Agreement for the Provision of Temporary Support during Wildland Firefighting Operations*. (DOI Agreement No. 1422RAI050018, USDA Agreement No. 05-IA-11130206-053). Washington, DC: Department of Defense, 2010.

United States Forest Service. "Fire and Aviation Management-Aviation." November 15, 2014. http://www.fs.fed.us/fire/aviation/.

United States Forest Service, Fire and Aviation Management. "Seeing Red: A Short History of Fire Retardant and the Forest Service." Accessed July 26, 2015. http://www.fs.fed.us/fire/retardant/history.html.

United States Government Accountability Office. *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Success*. (GAO-13-684). Washington, DC: U.S. Government Accountability Office, 2013.

United States House of Representatives. "The Legislative Process." Accessed October 4, 2015. http://www.house.gov/content/learn/legislative_process/.

United States Library of Congress. *Military Support to Civil Authorities: The Role of the Department of Defense in Support of Homeland Defense.* Washington, DC: Library of Congress, 2007.

United States Northern Command. “Defending Our Homeland.” December 6, 2014. http://www.northcom.mil/Home.aspx.

———. “USNORTHCOM Mission.” May 16, 2013. http://www.northcom.mil/Newsroom/FactSheets/ArticleView/tabid/3999/Article/563996/usnorthcom-vision.aspx.

Wade, Norman M. *HDS1 Smartbook, Homeland Defense and DSCA: Protecting the Homeland/Defense Support to Civil Authority*. Lakeland, FL: The Lightning Press, 2015.

Watson, Blair. “Fighting Wildfires.” *Frontline Security* 6, no. 2 (Summer 2011).

Wildland Fire Lessons Learned Center. “Waldo Canyon Fire Review.” September 26, 2013. http://www.wildfirelessons.net/communities/community-home/librarydocuments/viewdocument?DocumentKey=da3e0589-a61e-4988-b849-c7a76a3ce6c3&tab=librarydocuments.

Wineke, Andrew. “Waldo Canyon Fire Most Expensive in State History.” *The Gazette*, July 17, 2012. http://gazette.com/waldo-canyon-fire-most-expensive-in-state-history/article/141783.

Wollman, Lauren. *Research Paradigms.* Naval Postgraduate School video. Research Colloquium course. Recorded summer 2008, 7:03. https://www.chds.us/coursefiles/research/lectures/research_paradigms/player.html.

THIS PAGE INTENTIONALLY LEFT BLANK

# INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California